THE LOGISTICS PERFORMANCE INDEX

1 Introduction

The Logistics Performance Index is based on a worldwide survey of operators on the ground (global freight forwarders and express carriers), providing feedback on the logistics “friendliness” of the countries in which they operate and those with which they trade. They combine in-depth knowledge of the countries in which they operate with informed qualitative assessments of other countries with which they trade, and experience of global logistics environment.

The LPI measures on-the-ground trade logistics performance – year 2012, in 155 countries - helping national leaders, key policymakers, and private sector traders understand the challenges they and their trading partners face in reducing logistical barriers to international commerce.

World Bank conducts the LPI Survey every two years to improve the reliability of the indicators and to build a dataset comparable across countries and over time.

2 Logistics Performance Index (LPI)

The LPI consists therefore of both qualitative and quantitative measures and helps build profiles of logistics friendliness for these countries. It measures performance along the logistics supply chain within a country and offers two different perspectives:

- **International LPI provides** qualitative evaluations of a country in six areas by its trading partners - logistics professionals working outside the country.
- **Domestic LPI provides** both qualitative and quantitative assessments of a country by logistics professionals working inside it. It includes detailed information on the logistics environment, core logistics processes, institutions, and performance time and cost data. [1]

A multidimensional assessment of logistics performance, the LPI compares the trade logistics profiles of 155 countries and rates them on a scale of 1 (worst) to 5 (best). The ratings are based on 6,000 individual country assessments by nearly 1,000 international
freight forwarders, who rated the eight foreign countries their company serves most frequently. The LPI’s six components include:

- The efficiency of the clearance process (speed, simplicity, and predictability of formalities) by border control agencies, including customs.
- The quality of trade- and transport-related infrastructure (ports, railroads, roads, information technology).
- The ease of arranging competitively priced shipments.
- The competence and quality of logistics services (transport operators, customs brokers).
- The ability to track and trace consignments.
- The frequency with which shipments reach the consignee within the scheduled or expected delivery time.

The components were chosen based on recent theoretical and empirical research and on the practical experience of logistics professionals involved in international freight forwarding. Earlier methodologies developed in 1993 used a survey format, a 2-point scale, and open-ended questions — to measure the perceived importance and influence of different component attributes affecting the logistical friendliness of countries.

The methodology was refined with contributions from interviews conducted for the Trade and Transport Facilitation Audits performed by the World Bank and others over more than a decade. The figure 1 maps the six LPI indicators in two main categories:

- Areas for policy regulation, indicating main inputs to the supply chain (customs, infrastructure, and services).
- Supply chain performance outcomes (corresponding to LPI indicators of time, cost, and reliability — timeliness, international shipments, and tracking and tracing).
The LPI uses standard statistical techniques to aggregate the data into a single indicator. This single indicator can be used to compare countries, regions, and income groups. It can also be used for country-level work.

Because operators on the ground can best assess these vital aspects of logistics performance, the LPI relies on a structured online survey of logistics professionals from the companies responsible for moving goods around the world: multinational freight forwarders and the main express carriers.

Freight forwarders and express carriers are those best able to assess how countries perform. And their views matter, directly affecting the choice of shipping routes and gateways and influencing firms’ decisions on production location, choice of suppliers, and selection of target markets. Their participation is central to the quality and credibility of the LPI, and their involvement and feedback have been essential in developing and refining the survey in this third edition of the LPI.
3 The LPI Methodology

Because logistics has many dimensions, measuring and summarizing performance across countries is challenging. Examining the time and costs associated with logistics processes - port processing, customs clearance, transport, and the like - is a good start, and in many cases this information is readily available. But even when complete, this information cannot be easily aggregated into a single, consistent, cross-country dataset, because of structural differences in countries’ supply chains. Even more important, many critical elements of good logistics - such as process transparency, service quality, predictability, and reliability - cannot be assessed using only time and cost information.

3.1 Constructing the international LPI

The first part of the LPI survey (questions 10–15) informs the international LPI. Each survey respondent rates eight overseas markets on six core components of logistics performance. The eight countries are chosen based on the most important export and import markets of the country where the respondent is located, on random selection, and — for landlocked countries — on neighboring countries that form part of the land bridge connecting them with international markets. The method used to select the group of countries rated by each respondent varies by the characteristics of the country where the respondent is located (Tab. 1).

<table>
<thead>
<tr>
<th>Respondents from coastal countries</th>
<th>Respondents from low – income countries</th>
<th>Respondents from middle – income countries</th>
<th>Respondents from high – income countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Five most important export partner countries + Three most important partner countries</td>
<td>Three most important export partner countries + The most important import partner country + four countries randomly one from each country group: Africa East Asia and Central Asia Latin America OECD and Europe less Central Asia</td>
<td>Two countries randomly from a list of five most important import partner countries + Four countries randomly, one from each country group: Africa East Asia and Central Asia Latin America OECD and Europe less Central Asia</td>
<td>Two countries randomly from the combined country groups a, b, c, and d</td>
</tr>
</tbody>
</table>
Respondents from low – income countries

Respondents from middle – income countries

Respondents from high – income countries

<table>
<thead>
<tr>
<th>Respondents from landlocked countries</th>
<th>Respondents from low – income countries</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Four most important export partner countries</td>
</tr>
<tr>
<td>+</td>
<td>One most important import partner country</td>
</tr>
<tr>
<td>+</td>
<td>Two land – bridge countries</td>
</tr>
<tr>
<td>+</td>
<td>Two countries randomly one from each country group: Africa, East Asia and Central Asia, and Latin America OECD and Europe less Central Asia</td>
</tr>
</tbody>
</table>

Source: [5]

Respondents take the survey online. The 2012 survey engine builds a set of countries for the survey respondents that are subject to the rule set (see figure 2). After 200 surveys, the USR approach is introduced into the engine’s process for country selection. For each new survey respondent, the Uniform Sampling Randomized (USR) approach solicits a response from a country chosen at random but with non-uniform sampling - with weights chosen to evolve the sampling toward uniform probability. Specifically, a country i is chosen with a probability \((N – ni) / 2N\), where \(ni\) is the sample size of country i so far, and \(N\) is the total sample size.

The international LPI is a summary indicator of logistics sector performance, combining data on six core performance components into a single aggregate measure. Some respondents did not provide information for all six components, so interpolation is used to fill in missing values. The missing values are replaced with the country mean response for each question, adjusted by the respondent’s average deviation from the country mean in the answered questions.
The six core components are:

- The efficiency of customs and border management clearance, rated from “very low” (1) to “very high” (5).
- The quality of trade and transport infrastructure, rated from “very low” (1) to “very high” (5).
- The ease of arranging competitively priced shipments, rated from “very difficult” (1) to “very easy” (5).
- The competence and quality of logistics services, rated from “very low” (1) to “very high” (5).
- The ability to track and trace consignments, rated from “very low” (1) to “very high” (5).
- The frequency with which shipments reach consignees within scheduled or expected delivery times, rated from “hardly ever” (1) to “nearly always” (5).

To construct the international LPI, normalized scores for each of the six original indicators are multiplied by their component loadings (Tab. 2) and then summed. The component loadings represent the weight given to each original indicator in constructing the international LPI. Since the loadings are similar for all six, the international LPI is close to a simple average of the indicators.

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customs</td>
<td>0.41</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>0.41</td>
</tr>
<tr>
<td>Logistics quality and competence</td>
<td>0.40</td>
</tr>
<tr>
<td>Tracking and tracing</td>
<td>0.41</td>
</tr>
<tr>
<td>Timeliness</td>
<td>0.40</td>
</tr>
</tbody>
</table>

Source: [5]

To calculate the confidence interval, the standard error of LPI scores across all respondents is estimated for a country. The upper and lower bounds of the confidence interval are then
\[ LPI \pm t_{(0.1 \cdot N - 1)} \frac{s}{\sqrt{N}} \]  

where \( N \) is the number of survey respondents for that country
\( s \) is the estimated standard error of each country’s LPI score
\( t \) is Student’s \( t \) – distribution

The high and low scores are used to calculate upper and lower bounds on country ranks. The upper bound is the LPI rank a country would receive if its LPI score were at the upper bound of the confidence interval rather than at the center. The lower bound is the LPI rank a country would receive if its LPI score were at the lower bound of the confidence interval rather than at the center. In both cases, the scores of all other countries are kept constant.

The results of the top 10 performers of the last survey (2012) you can see in Tab. 3. Czech Republic is on 44 place and Slovakia is on 51 place of the LPI rank.

<table>
<thead>
<tr>
<th>Economy</th>
<th>2012</th>
<th>2010</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LPI rank</td>
<td>LPI score</td>
<td>% of highest performance</td>
</tr>
<tr>
<td>Singapore</td>
<td>1</td>
<td>4.13</td>
<td>100.0</td>
</tr>
<tr>
<td>Hong Kong SAR, China</td>
<td>2</td>
<td>4.12</td>
<td>99.9</td>
</tr>
<tr>
<td>Finland</td>
<td>3</td>
<td>4.05</td>
<td>97.6</td>
</tr>
<tr>
<td>Germany</td>
<td>4</td>
<td>4.03</td>
<td>97.0</td>
</tr>
<tr>
<td>Netherlands</td>
<td>5</td>
<td>4.02</td>
<td>96.7</td>
</tr>
<tr>
<td>Denmark</td>
<td>6</td>
<td>4.02</td>
<td>96.6</td>
</tr>
<tr>
<td>Belgium</td>
<td>7</td>
<td>3.98</td>
<td>95.3</td>
</tr>
<tr>
<td>Japan</td>
<td>8</td>
<td>3.93</td>
<td>93.8</td>
</tr>
<tr>
<td>United States</td>
<td>9</td>
<td>3.93</td>
<td>93.7</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>10</td>
<td>3.90</td>
<td>92.7</td>
</tr>
</tbody>
</table>

Source: [5]

4 Conclusion

The LPI provides a simple, global benchmark to measure logistics performance, filling gaps in datasets by providing systematic, cross-country comparisons. By asking freight forwarders to rate countries on key logistics issues - such as customs clearance efficiency, infrastructure quality, and the ability to track cargo - it captures a broad set of elements that
affect perceptions of the efficiency of trade logistics in practice. It is a “coarse-grained” indicator that shows where a country stands and that could motivate researchers to take on a deeper, finer, country-specific assessment of the determinants of logistics performance.

The LPI reflects the perspective of the global private sector on how countries are globally connected through their main trade gateways, so it might not fully capture changes at the country level.

Trade analysts, policymakers, and practitioners interested in measuring logistics performance all use the LPI. The World Bank and other international organizations are using it more and more in their advisory and implementation activities for trade facilitation in developing countries.

The LPI allows leaders in government, business, and civil society to better assess the competitive advantage created by good logistics and to understand the varying importance of different intervention areas.

Acknowledgement

This paper has been developed under support of project: MŠ SR VEGA č. 1/0144/11 POLIAK, M.: The impact of quality change provided services of public passenger transport on increasing its competitiveness in relation to individual motoring.

References


Resume

The LPI measures logistics efficiency, now widely recognized as vital for trade and growth. A country’s ability to trade globally depends on its traders’ access to global freight and logistics networks. And the efficiency of a country’s supply chain (in cost, time, and reliability) depends on specific features of its domestic economy (logistics performance). Better overall logistics performance and trade facilitation are strongly associated with trade expansion, export diversification, attractiveness to foreign direct investment, and economic growth.

The LPI score and country rankings for the six main component indicators come from the international part of the survey, a collection of information provided by foreign logistics professionals.

Key words

Logistics, performance, index, methodology
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