

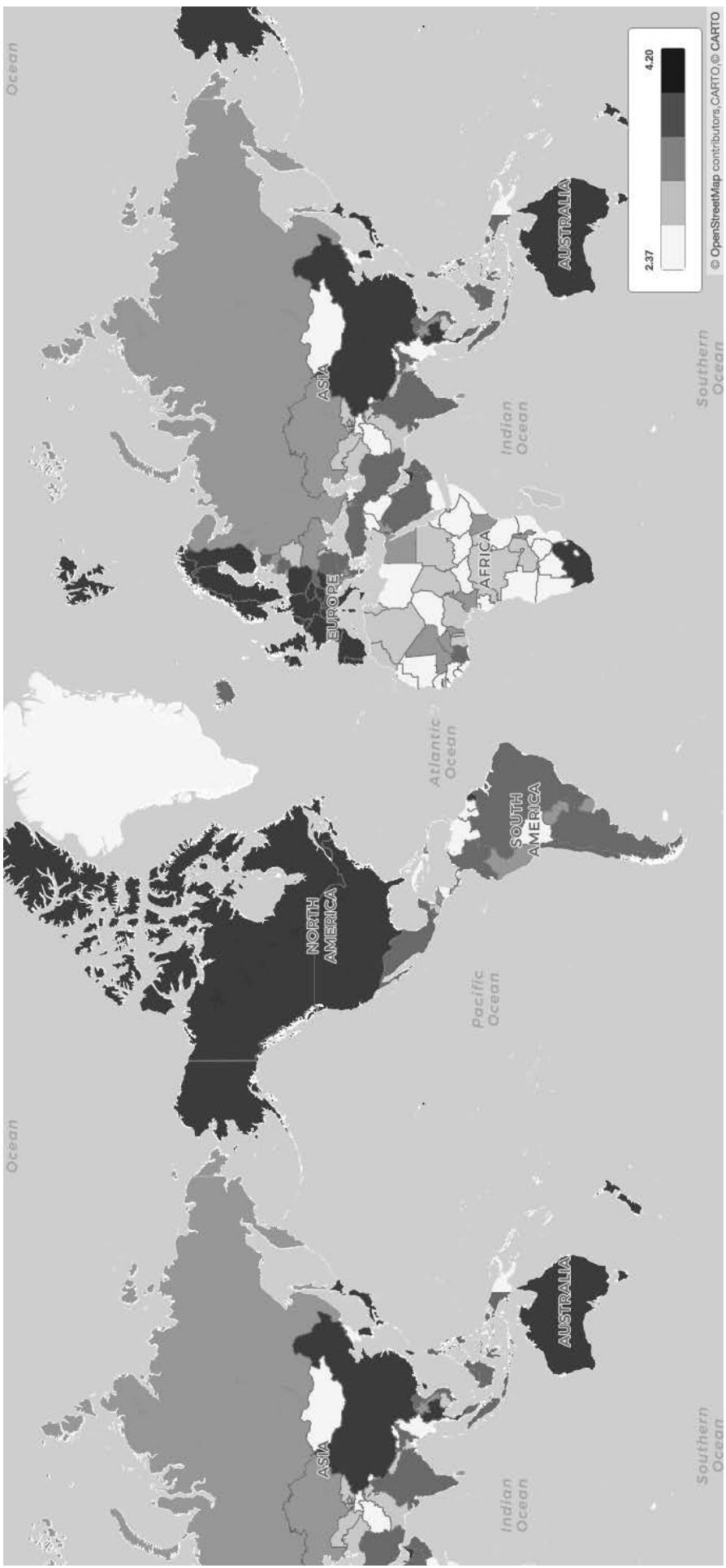
# Connecting to Compete

2018

## Trade Logistics in the Global Economy



The Logistics Performance Index and Its Indicators



LPI score, 2012–18  
(1 is the lowest score;  
5 is the highest score)

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# **Connecting to Compete 2018**

## **Trade Logistics in the Global Economy**

The Logistics Performance Index and Its Indicators

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# Foreword

Caroline Freund, Director, Macroeconomics, Trade and Investment Global Practice, The World Bank Group

José Luis Irigoyen, Senior Director, Transport and Digital Development Global Practice, The World Bank Group

We are happy to present the sixth edition of *Connecting to Compete* and the 2018 edition of the Logistics Performance Index (LPI). This interdisciplinary World Bank project was launched just over 10 years ago. The ambition was to develop simple comparators of how efficiently supply chains connect firms to markets, or logistics performance.

Since 2007, most of the countries the World Bank Group works with are well aware of the importance of logistics performance for growth and integration. The cross-cutting nature of logistics as a policy area is widely recognized: logistics is not just about connecting infrastructure but encompasses regulation of services, sustainability, and resilience, or trade facilitation.

We see that this regular publication has had a significant impact in helping countries frame their own policies and motivate consistent approaches to interventions and reforms at the national level. In some cases, the World Bank has been asked to provide support, which we did by bringing expertise and tools that address the country-specific supply chain constraints more deeply than the rough indications from the LPI can. The LPI remains unique in providing a common referential across countries.

The exercise may seem a bit repetitive. The list of best performers does not change very much over the course of two years. We invite the reader to look beyond country rankings and look at the nexus of themes and policies. The logistics sector is changing fast, in terms of the nature of demand (for example, e-commerce), players, use of technology, new risks (cybersecurity), and policy concerns. Professionals and countries are increasingly concerned with the environmental footprint and resilience of supply chains.

We hope this work will appeal to a broad and diverse audience: policy makers, practitioners, and researchers. We are confident readers will find this report and its data useful.

**Caroline Freund**

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Macroeconomics, Trade and Investment  
Global Practice  
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Senior Director  
Transport and Digital Development  
Global Practice  
The World Bank Group

# Foreword

Young Tae Kim, Secretary-General, International Transport Forum at the Organisation for Economic Co-operation and Development

Logistics is an elevated priority for many member countries of the International Transport Forum. Because facilitating trade and transport is at the core of stimulating economic development, several countries have developed comprehensive national logistics strategies. Well-functioning domestic and international logistics is a precondition of national competitiveness. And fact-based metrics can provide reliable benchmarks, assess policy impacts, and compare global advances in logistics.

The World Bank Logistics Performance Index (LPI) is a unique benchmarking tool, providing the same measure for more than 160 countries. At the International Transport Forum, we use the LPI as the most important starting point of dialogue with our member countries on the drivers of logistics performance. The six components of the LPI—customs, infrastructure, ease of arranging shipments, quality of logistics services, timeliness, and tracking and

tracing—point to policy actions that can support the improvement of each individual element. International Transport Forum studies have examined the drivers of logistics performance and assessed the development of national logistics observatories in Chile, Mexico, Turkey, and more recently Vietnam.

The LPI is a crucial part of global efforts to better understand logistics performance in the context of increasingly complex supply chains. I am sure the 2018 edition of the LPI will be used extensively by governments, international organizations, private firms, and academia in efforts to improve logistics—the backbone of the global economy.

**Young Tae Kim**  
Secretary-General  
International Transport Forum at the  
Organisation for Economic Co-operation  
and Development

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The Logistics Performance Index (LPI) survey would not have been possible without the support and participation of the International Federation of Freight Forwarders Associations

([www.ifata.com](http://www.ifata.com)), especially of Marco Sorgetti, FIATA’s former Director General, as well as Hans Günther Kersten, FIATA’s current Director General. National freight forwarding associations and a large group of small, medium, and large logistics companies worldwide were instrumental in disseminating the survey. The survey was designed with Finland’s Turku School of Economics, University of Turku ([www.utu.fi/en](http://www.utu.fi/en)), which has worked with the World Bank to develop the concept since 2007.

The authors are also grateful to external colleagues for their support and contributions in reaching out to forwarding associations and providing inputs for the report, including Ruth Banomyong (Thammasat University, Thailand), Tapio Naula (Oman Logistics Center), and Cesar Lavalle (ILOS Brazil). Daniel Cramer of BlueTundra.com designed, developed, and maintained the LPI survey and result websites under the guidance of the core team. Scott Johnson from the World Bank Information Solutions Group helped the team distribute the survey.

The authors thank the hundreds of employees of freight forwarding and express carrier companies around the world who responded to the survey. Their participation was central to the quality and credibility of the project, and their continuing feedback will be essential as we develop and refine the survey and the LPI in years to come.



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## Aggregate LPI ranking and scores, 2012–18

This year's edition of *Connecting to Compete* features the aggregated 2012–18 results. The methodology is included in appendix 1. The 2018 single-year results can be found in appendix 2.

| Economy              | Mean rank | Mean LPI score, 2012–18 | % of highest performer | Economy                | Mean rank | Mean LPI score, 2012–18 | % of highest performer | Economy                   | Mean rank | Mean LPI score, 2012–18 | % of highest performer |
|----------------------|-----------|-------------------------|------------------------|------------------------|-----------|-------------------------|------------------------|---------------------------|-----------|-------------------------|------------------------|
| Germany              | 1         | 4.19                    | 100.0                  | Bulgaria               | 57        | 3.00                    | 71.7                   | Moldova                   | 113       | 2.52                    | 60.1                   |
| Netherlands          | 2         | 4.07                    | 97.2                   | Botswana*              | 58        | 2.96                    | 70.7                   | Comoros                   | 114       | 2.51                    | 60.1                   |
| Sweden               | 3         | 4.07                    | 97.2                   | Kuwait                 | 59        | 2.96                    | 70.6                   | Guatemala                 | 115       | 2.51                    | 59.9                   |
| Belgium              | 4         | 4.05                    | 96.9                   | Egypt, Arab Rep.       | 60        | 2.95                    | 70.5                   | Armenia                   | 116       | 2.51                    | 59.9                   |
| Singapore            | 5         | 4.05                    | 96.6                   | Malta                  | 61        | 2.94                    | 70.3                   | Uzbekistan                | 117       | 2.50                    | 59.7                   |
| United Kingdom       | 6         | 4.01                    | 95.7                   | Argentina              | 62        | 2.93                    | 70.0                   | Zambia*                   | 118       | 2.49                    | 59.4                   |
| Japan                | 7         | 3.99                    | 95.3                   | Kenya                  | 63        | 2.93                    | 69.9                   | Togo                      | 119       | 2.48                    | 59.4                   |
| Austria              | 8         | 3.99                    | 95.2                   | Philippines            | 64        | 2.91                    | 69.6                   | Lao PDR                   | 120       | 2.48                    | 59.2                   |
| Hong Kong SAR, China | 9         | 3.96                    | 94.6                   | Rwanda                 | 65        | 2.90                    | 69.3                   | Nepal                     | 121       | 2.45                    | 58.6                   |
| United States        | 10        | 3.92                    | 93.7                   | Côte d'Ivoire          | 66        | 2.89                    | 69.0                   | Guyana                    | 122       | 2.45                    | 58.6                   |
| Denmark              | 11        | 3.92                    | 93.6                   | Tanzania*              | 67        | 2.88                    | 68.8                   | Azerbaijan*               | 123       | 2.45                    | 58.5                   |
| Finland              | 12        | 3.92                    | 93.5                   | Serbia                 | 68        | 2.83                    | 67.7                   | Georgia                   | 124       | 2.45                    | 58.5                   |
| Switzerland          | 13        | 3.91                    | 93.4                   | Ukraine                | 69        | 2.83                    | 67.5                   | Cameroon                  | 125       | 2.43                    | 58.1                   |
| United Arab Emirates | 14        | 3.89                    | 92.8                   | Ecuador                | 70        | 2.82                    | 67.4                   | Djibouti                  | 126       | 2.43                    | 58.1                   |
| France               | 15        | 3.86                    | 92.2                   | Colombia               | 71        | 2.81                    | 67.1                   | Trinidad and Tobago*      | 127       | 2.41                    | 57.5                   |
| Luxembourg           | 16        | 3.84                    | 91.8                   | Uganda*                | 72        | 2.79                    | 66.7                   | Guinea-Bissau             | 128       | 2.40                    | 57.4                   |
| Canada               | 17        | 3.81                    | 90.9                   | Brunei Darussalam*     | 73        | 2.78                    | 66.5                   | Mongolia                  | 129       | 2.40                    | 57.3                   |
| Spain                | 18        | 3.78                    | 90.3                   | Peru                   | 74        | 2.78                    | 66.5                   | Sudan                     | 130       | 2.40                    | 57.3                   |
| Australia            | 19        | 3.77                    | 90.0                   | Uruguay                | 75        | 2.78                    | 66.4                   | Ethiopia*                 | 131       | 2.40                    | 57.2                   |
| Norway               | 20        | 3.74                    | 89.3                   | Jordan                 | 76        | 2.78                    | 66.3                   | Kyrgyz Republic           | 132       | 2.38                    | 57.0                   |
| Italy                | 21        | 3.73                    | 89.2                   | Kazakhstan             | 77        | 2.77                    | 66.2                   | Congo, Rep.               | 133       | 2.38                    | 56.7                   |
| New Zealand          | 22        | 3.68                    | 88.0                   | Bosnia and Herzegovina | 78        | 2.76                    | 65.8                   | Fiji                      | 134       | 2.37                    | 56.7                   |
| Korea, Rep.          | 23        | 3.65                    | 87.3                   | Costa Rica             | 79        | 2.74                    | 65.4                   | Venezuela, RB             | 135       | 2.37                    | 56.5                   |
| Taiwan, China        | 24        | 3.65                    | 87.2                   | Namibia*               | 80        | 2.73                    | 65.1                   | Bolivia                   | 136       | 2.36                    | 56.5                   |
| Ireland              | 25        | 3.63                    | 86.8                   | Iran, Islamic Rep.*    | 81        | 2.71                    | 64.8                   | Madagascar                | 137       | 2.35                    | 56.1                   |
| Czech Republic       | 26        | 3.62                    | 86.4                   | Lebanon                | 82        | 2.71                    | 64.7                   | Gambia, The*              | 138       | 2.34                    | 56.0                   |
| China                | 27        | 3.60                    | 86.1                   | Paraguay               | 83        | 2.70                    | 64.6                   | Myanmar                   | 139       | 2.34                    | 55.9                   |
| Portugal             | 28        | 3.56                    | 85.1                   | Malawi*                | 84        | 2.69                    | 64.3                   | Chad                      | 140       | 2.34                    | 55.9                   |
| South Africa         | 29        | 3.51                    | 83.8                   | Russian Federation     | 85        | 2.69                    | 64.2                   | Senegal                   | 141       | 2.34                    | 55.8                   |
| Qatar                | 30        | 3.50                    | 83.7                   | Dominican Republic     | 86        | 2.68                    | 64.1                   | Turkmenistan*             | 142       | 2.34                    | 55.8                   |
| Poland               | 31        | 3.50                    | 83.5                   | Morocco*               | 87        | 2.67                    | 63.8                   | Congo, Dem. Rep.          | 143       | 2.33                    | 55.6                   |
| Hungary              | 32        | 3.41                    | 81.5                   | El Salvador            | 88        | 2.66                    | 63.6                   | Papua New Guinea          | 144       | 2.31                    | 55.2                   |
| Israel*              | 33        | 3.39                    | 81.0                   | Cambodia               | 89        | 2.66                    | 63.5                   | Guinea                    | 145       | 2.30                    | 54.9                   |
| Thailand             | 34        | 3.36                    | 80.2                   | Bahamas, The           | 90        | 2.65                    | 63.3                   | Liberia                   | 146       | 2.29                    | 54.7                   |
| Malaysia             | 35        | 3.34                    | 79.9                   | Mauritius*             | 91        | 2.65                    | 63.3                   | Tajikistan                | 147       | 2.29                    | 54.6                   |
| Estonia              | 36        | 3.30                    | 78.8                   | Sri Lanka*             | 92        | 2.65                    | 63.2                   | Niger                     | 148       | 2.29                    | 54.6                   |
| Turkey               | 37        | 3.29                    | 78.6                   | Benin                  | 93        | 2.65                    | 63.2                   | Yemen, Rep.*              | 149       | 2.27                    | 54.3                   |
| Iceland              | 38        | 3.29                    | 78.6                   | Montenegro             | 94        | 2.65                    | 63.2                   | Central African Republic* | 150       | 2.26                    | 54.0                   |
| Slovenia             | 39        | 3.29                    | 78.5                   | Pakistan               | 95        | 2.64                    | 62.9                   | Bhutan                    | 151       | 2.25                    | 53.7                   |
| Chile                | 40        | 3.28                    | 78.4                   | Burkina Faso           | 96        | 2.63                    | 62.9                   | Cuba                      | 152       | 2.23                    | 53.4                   |
| Panama               | 41        | 3.26                    | 77.8                   | Maldives               | 97        | 2.63                    | 62.8                   | Lesotho                   | 153       | 2.22                    | 53.0                   |
| India                | 42        | 3.22                    | 77.0                   | Albania*               | 98        | 2.62                    | 62.5                   | Burundi                   | 154       | 2.22                    | 53.0                   |
| Lithuania            | 43        | 3.20                    | 76.4                   | Macedonia, FYR         | 99        | 2.62                    | 62.5                   | Libya                     | 155       | 2.21                    | 52.9                   |
| Greece               | 44        | 3.19                    | 76.2                   | Bangladesh*            | 100       | 2.60                    | 62.0                   | Equatorial Guinea*        | 156       | 2.21                    | 52.7                   |
| Vietnam              | 45        | 3.16                    | 75.5                   | Ghana                  | 101       | 2.60                    | 62.0                   | Mauritania                | 157       | 2.20                    | 52.5                   |
| Oman                 | 46        | 3.16                    | 75.5                   | Mozambique*            | 102       | 2.59                    | 61.9                   | Gabon                     | 158       | 2.19                    | 52.3                   |
| Slovak Republic      | 47        | 3.14                    | 75.0                   | Nigeria                | 103       | 2.59                    | 61.8                   | Iraq                      | 159       | 2.18                    | 52.2                   |
| Croatia              | 48        | 3.12                    | 74.4                   | Tunisia                | 104       | 2.59                    | 61.8                   | Angola                    | 160       | 2.18                    | 52.1                   |
| Cyprus               | 49        | 3.10                    | 74.0                   | São Tomé and Príncipe  | 105       | 2.56                    | 61.3                   | Zimbabwe                  | 161       | 2.17                    | 51.8                   |
| Romania              | 50        | 3.10                    | 74.0                   | Honduras               | 106       | 2.56                    | 61.2                   | Eritrea                   | 162       | 2.11                    | 50.4                   |
| Indonesia            | 51        | 3.08                    | 73.6                   | Algeria                | 107       | 2.56                    | 61.1                   | Syrian Arab Republic      | 163       | 2.10                    | 50.2                   |
| Saudi Arabia         | 52        | 3.08                    | 73.6                   | Nicaragua*             | 108       | 2.56                    | 61.0                   | Sierra Leone*             | 164       | 2.06                    | 49.3                   |
| Mexico               | 53        | 3.08                    | 73.6                   | Mali*                  | 109       | 2.55                    | 60.9                   | Afghanistan               | 165       | 2.04                    | 48.7                   |
| Bahrain              | 54        | 3.06                    | 73.2                   | Belarus                | 110       | 2.54                    | 60.6                   | Haiti                     | 166       | 2.02                    | 48.3                   |
| Latvia               | 55        | 3.02                    | 72.3                   | Jamaica                | 111       | 2.52                    | 60.3                   | Somalia*                  | 167       | 2.00                    | 47.7                   |
| Brazil               | 56        | 3.02                    | 72.1                   | Solomon Islands        | 112       | 2.52                    | 60.2                   |                           |           |                         |                        |

\* Countries with missing values for one or two editions. For details, see appendix 1.

# Summary and key findings

This sixth edition of *Connecting to Compete*, the Logistics Performance Index (LPI) report, presents the latest worldwide view on trade logistics performance across more than 160 countries as seen by logistics professionals. This biennial information on logistics infrastructure, service provision, cross-border trade facilitation, and other aspects is invaluable for policy makers, traders, and a wide audience of other stakeholders, including researchers and teachers.

The LPI survey data provide numerical evidence on how easy or difficult it is in these countries to transport general merchandise—typically manufactured products in unitized form. The six main indicators of the international part of the LPI summarize on a five-point scale the assessments of logistics professionals worldwide trading with the country.

The domestic part of the LPI indicates the quality and availability of key logistics services within a country, but due to the small number of responses, these data are more informative in comparisons by region or income group.

Logistics is understood as a network of services that support the physical movement of goods, trade across borders, and commerce within borders. It comprises an array of activities beyond transportation, including warehousing, brokerage, express delivery, terminal operations, and related data and information management.

The global turnover generated by these networks exceeds US\$4.3 trillion, so a better understanding of their operation is no trivial issue.<sup>1</sup> For individual countries, logistics performance is key to economic growth and competitiveness. Inefficient logistics raises the cost of doing business and reduces the potential for both international and domestic integration. The toll can be particularly heavy for developing countries trying to compete in the global marketplace.

## Logistics performance matters

Not surprisingly, an effective logistics sector is now recognized almost everywhere as one of the core enablers of development. Previous editions of *Connecting to Compete* have highlighted how implementing better policies leads to better logistics performance. Such policies cover, for example, regulating services; providing transportation infrastructure; implementing controls, especially for international goods; and raising the quality of public–private partnerships (PPPs).

The policy focus has evolved since 2007, when the first LPI report was published. Initially, logistics policies tended to concentrate on facilitating trade and removing border bottlenecks. Today, international logistics is increasingly intertwined with domestic logistics. Policy makers and stakeholders deal with a wide range of policies. Growing concerns include spatial planning; skills and resources for training; the environmental, social, and economic sustainability of the supply chain; and the resilience of the supply chain to disruption or disaster (physical or digital).

## Gaps in logistics performance persist

Overall, the score profile of the entire set of more than 160 countries has remained similar since the 2007 edition, an indication of the robust nature of underlying data.<sup>2</sup> The modest convergence of scores from 2007 to 2014 was explained in the 2014 edition by a perceived improvement in the trade-supporting infrastructure of low- and middle-income countries and, to less extent, in their logistics services and customs and border management. This

Countries that have traditionally dominated the supply chain industry occupy the top 10 rankings: eight in Europe plus Japan and Singapore

explanation appeared largely valid for most countries being ranked. In 2016, however, the gap seemed to widen between the top and the bottom, with the highest average scores ever for the top 10 countries (4.13 on a scale from 1 to 5) and the lowest scores since 2007 for countries at the bottom (1.91; table S.1).

In 2018, the gap between top and bottom performers narrowed again. The average score for the top 10 countries dropped to 4.03, whereas the bottom 10 countries scored an all-time high of 2.08 (figure S.1).

High-income countries occupied the top 10 rankings in 2018,<sup>3</sup> eight in Europe plus Japan and Singapore—countries that have traditionally dominated the supply chain industry. Germany is at the top, scoring 4.20. The scores of the following nine countries are in a tight interval, with Sweden in 2nd with a score of 4.05 and Finland in 10th with a score of 3.97.

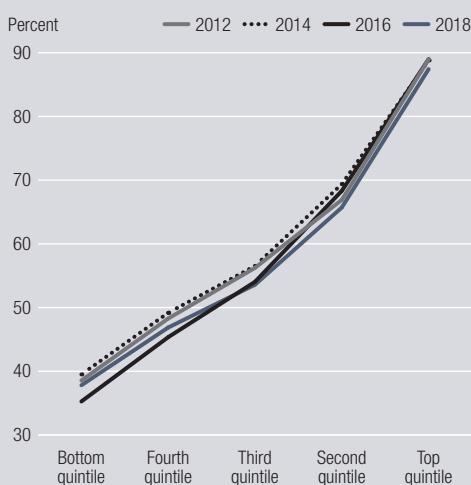
The bottom 10 countries are mostly low-income and lower-middle-income countries in Africa or isolated areas. Some are fragile economies affected by armed conflict, natural disasters, and political unrest. Others are landlocked countries naturally challenged by geography or economies of scale in connecting to global supply chains. Afghanistan ranks 160th with a score 1.95, preceded by Angola (2.05), Burundi (2.06), and Niger (2.07).

Among the lower-middle-income countries, large economies such as India (44th with a score of 3.18) and Indonesia (46th with a score of 3.15) and emerging economies such as Vietnam (39th with a score of 3.27) and Côte d'Ivoire (50th with a score of 3.08) stand out as top performers. Most of these countries either have access to sea or are located close to major transportation hubs.

The composition of the top-performing upper-middle-income economies has changed

Figure S.1

**LPI score as a percentage of the highest score by quintile average, 2012, 2014, 2016, and 2018**



Source: Logistics Performance Index 2012, 2014, 2016, and 2018.

marginally, with China (26th with a score of 3.61), Thailand (32nd with a score of 3.41), and South Africa (33rd with a score of 3.38) leading the group. Romania, Croatia, and Bulgaria also improved their rankings. Among low-income countries, those in East and West Africa lead in this year's edition.

### Supply chain reliability and service quality are strongly associated with logistics performance

Supply chain reliability is key to logistics performance. In a global environment, consignees require a high degree of certainty as to when and how deliveries will take place. Reliability is typically much more important than speed, and many shippers are willing to pay a premium. In other words, supply chain predictability is a matter not just of time and cost, but also a component of shipment quality (figure S.2).

Table S.1 | **Top 10 average and lowest 10 average LPI scores, 2007–18**

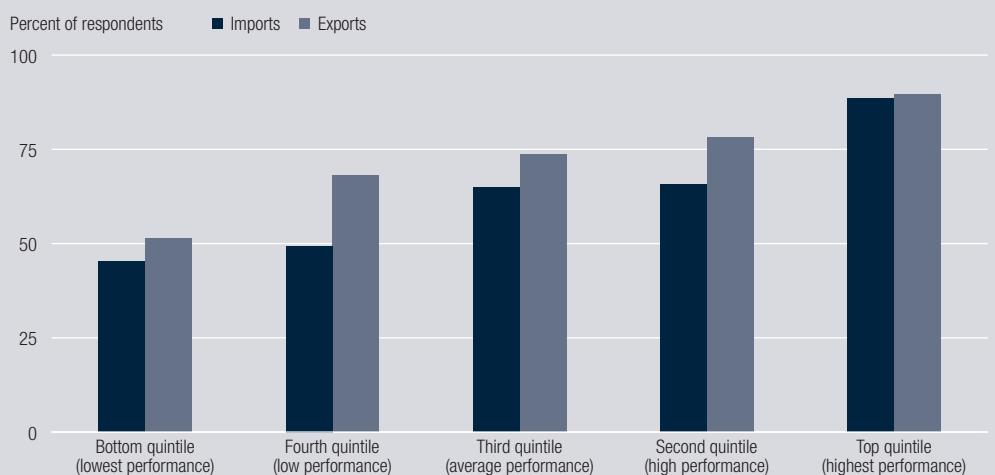
1=lowest; 5=highest

|                   | 2007 | 2010 | 2012 | 2014 | 2016 | 2018 |
|-------------------|------|------|------|------|------|------|
| Top 10 average    | 4.06 | 4.01 | 4.01 | 3.99 | 4.13 | 4.03 |
| Lowest 10 average | 1.84 | 2.06 | 2.00 | 2.06 | 1.91 | 2.08 |

Source: Logistics Performance Index 2007, 2010, 2012, 2014, and 2016.

Figure S.2

**Respondents reporting that shipments are “often” or “nearly always” cleared and delivered as scheduled, by LPI quintile**



Source: Logistics Performance Index 2018.

For the first time, the perceived improvement in infrastructure quality is higher in the bottom quintile than in the top

In the top LPI quintile, just 13 percent of shipments fail to meet company quality criteria—the same proportion as in 2014 and 2016. By comparison, two to three times as many shipments in the two bottom quintiles fail to meet these criteria, and quality criteria in low-performing countries tend to be less rigid than in high-performing ones. This finding illustrates the persistence of the logistics gap from an overall perspective of supply chain efficiency and reliability.

The differing pace of progress is also seen in the ratings of domestic trade and transport infrastructure, where respondents were asked to assess how much these have improved since 2015.

As in previous surveys, satisfaction with infrastructure quality varies by infrastructure type. For the first time, however, the perceived improvement is higher in the bottom quintile than in the top, although the difference is weaker in the middle of the distribution.

Respondents in all LPI quintiles are highly satisfied with information and communications technology (ICT) infrastructure. The infrastructure gap continues to narrow, particularly between the top and the bottom, where the rate of improvement seems noticeably faster. Improvement in the middle quintiles is on a par with what has been observed previously. In

contrast to ICT, rail infrastructure continues to elicit general dissatisfaction.

Similar patterns emerge when the domestic LPI data on infrastructure are disaggregated by World Bank region, excluding high-income countries. ICT is rated at the top or very close to the top in all regions.

### **Delivering good quality services is key to successful operations, and its importance is growing**

The LPI has shown that service quality drives logistics performance in practically all economies. Yet developing advanced services, such as third-party or fourth-party logistics, requires following a complex policy agenda, partly because such services cannot be created from scratch or developed purely domestically. In logistics-friendly countries, manufacturers and traders already outsource much of their basic logistics operations to third-party providers and focus on pursuing their core business while managing more complex supply chains issues. This handoff is reciprocal: the more that such advanced services are available at a reasonable cost, the more shippers will outsource their logistics. But the less that reliable and comprehensive services are available, the more shippers will handle logistics in house.

The 2018 LPI survey confirms that demand for sustainable supply chain management goes hand in hand with logistics performance

Logistics services are provided under very different operational environments globally. In a pattern recurring across years, the quality of the services that logistics firms provide is often perceived as better than the quality of the corresponding infrastructure that they operate. This may be explained partly by who the respondents are—freight forwarders and logistics firms rating their own services.

In a pattern seen across LPI editions, operations that support international trade, such as air and maritime transport and supporting services, tend to receive high scores even when infrastructure bottlenecks exist. Railroads, on the other hand, have low ratings almost everywhere. Low-income countries score poorly on road freight and warehousing.

Service quality can differ substantially at similar levels of perceived infrastructure quality. Even high-quality “hard” infrastructure cannot substitute for operational excellence, based on “soft” infrastructure such as professional skills and smooth business and administrative processes.

### **Supply chain resilience and sustainability are emerging concerns**

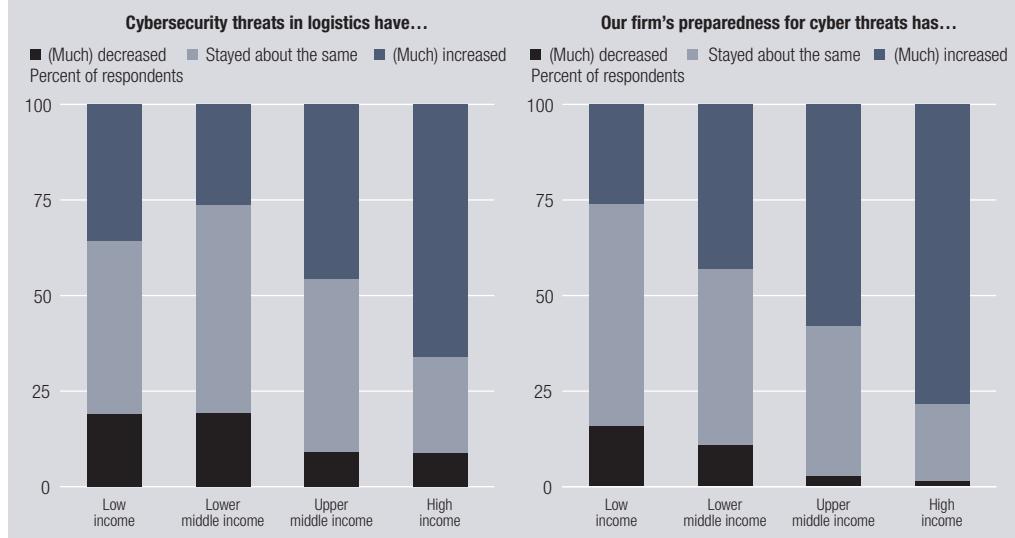
The resilience of international and domestic supply chains has emerged as a growing policy

concern worldwide. Resilience is understood as the ability of an organization (or a country) to recover from severe disruptions, whether human caused or natural. For 2018, the LPI survey included a question on cybersecurity resilience. The perceived magnitude of cyber-threats and preparedness to mitigate their effects go hand in hand (figure S.3). Developing countries lag far behind high-income countries in both.

The 2018 LPI survey confirms that demand for sustainable supply chain management goes hand in hand with logistics performance. This is especially true for environmentally sustainable services (green logistics). In the top quintile of LPI performers, 28 percent of respondents indicated that shippers often or nearly always ask for environmentally friendly options. In the second-highest quintile, the share drops to 14 percent, and it falls steadily in the third (9 percent), fourth (7 percent) and fifth (5 percent) quintiles.

This trend is in line with the increasing number of global and national commitments to reduce freight- and logistics-related greenhouse gases, particulate matter, and other harmful emissions. Regulatory changes have been implemented in all transport modes, and the international targets for 2030 and 2050, for example, are ever more challenging.

**Figure S.3 | Cybersecurity threats and preparedness by income**



Source: Logistics Performance Index 2018.

## **Pushing the envelope of implementation**

Implementation of effective policies to improve logistics performance is at least as challenging today as in 2007—for two reasons. First, the scope of implementation has widened from the traditional focus on infrastructure and trade facilitation. Sustainability and resilience receive more attention, and not only by developed countries, as do skills development and training, spatial dimensions of logistics, and the specificity of the regulatory and legal framework. In addition to these emerging fields, regulatory reforms of the logistics services sectors are critical but remain challenging to implement in many developing countries. Regulatory improvements aim to improve the quality of service delivery, building on market mechanisms and private sector participation, in the sectors that constitute the core of logistics activities, such as trucking, brokerage, and terminal or warehousing operations. The broad and cross-cutting logistics agenda challenge policy makers to make sense of which policy measures are needed, when, and using what resources.

Second, most reforms involve more than one agency and many stakeholders, slowing implementation, or even reversing it if cooperative mechanisms are not sustainable. This problem is well-known in developing countries for transport (for example, transport corridors) and trade facilitation (for example, single-window trade facilitation).

For consistent and broad reforms and improvements, countries must deal with this complexity. But countries in the middle and lower tiers of performance are deterred by weaker coordination mechanisms and private sector constituencies than countries with modern and innovative logistics sectors. Even though logistics services are provided overwhelmingly by the private sector, public sector actors and institutions play an essential role, without which logistics competitiveness is unlikely to improve.

Administrative reforms can be rapid when countries with a strong political will align their efforts. In some cases, soft reforms in facilitation of trade and transport were implemented

with considerable impact even before hard infrastructure projects were completed. The soft reforms provided a higher and quicker return on investment than hard infrastructure. Examples can be found in low- and middle-income countries such as India, Lao PDR, Southern African countries, and Vietnam and in high-income countries such as Oman. Unfortunately, performance may be degraded by governance weaknesses and economic and social turmoil, as for some Arab countries in the 2016 and 2018 LPI reports. Low-performing countries with serious governance challenges (conflict-ridden or postconflict countries and fragile states) are the most in need of attention from their neighbors and the international community.

Ultimately, countries that introduce far-reaching changes appear to be those that treat logistics as integral to the economy. They tend to combine policy perspectives, such as regulatory reform, trade facilitation, and trade and investment planning. Seamless interagency coordination and, above all, strong public–private dialogue characterize the top performers. They offer very positive examples of coordinating and facilitating logistics bodies, some of them public–private institutions such as the most famous one, the Dutch Dinalog.

## **Influence of the Logistics Performance Index**

Since its inception in 2007, the *Connecting to Compete* report providing LPI ratings has moved trade logistics firmly onto the policy agenda, even for countries that had not previously considered them. LPI results have also been used in many policy reports and documents prepared by multilateral organizations or the consultants they have engaged. The findings provide a worldwide general benchmark for the logistics industry and for logistics users.

LPI results have been embraced by the academic community, as evidenced by the widespread use of LPI data in research reports, journal articles, and textbooks. The results have also been used in teaching, and thousands of theses at all levels have cited the LPI.

Countries that introduce far-reaching changes appear to be those that treat logistics as integral to the economy

Using LPI data requires caution, because they are based on a web-based survey aggregating the views of the worldwide logistics and freight-forwarding community. To avoid overly simplistic conclusions, section 1 of *Connecting to Compete* presents detailed instructions on how to use—and how not to use—LPI data for various purposes.

\* \* \*

Logistics performance is based largely on reliable supply chains and predictable service delivery for traders. Global supply chains are becoming more and more complex. Ever more

demanding regulatory requirements for traders and operators are motivated by safety, social, environmental, and other reasons. Efficient management and information technology solutions in both the private and public sectors are tools for high-quality logistics. National competitiveness depends on the ability to manage logistics in today's global business environment.

More than ever, comprehensive reforms and long-term commitments are needed from policy makers and private stakeholders. The current LPI data provide a unique and updated reference for better understanding the impediments to trade logistics worldwide and for informing policy making and business decisions.

# The 2018 Logistics Performance Index

This is the sixth edition of *Connecting to Compete*, the biennial Logistics Performance Index (LPI) report. Global logistics is often referred to as the “physical internet,” as it was in the initial 2007 LPI report. Logistics is a network of services that support the physical movement of goods, trade across borders, and commerce within borders. Logistics encompasses an array of activities beyond transportation, including warehousing, brokerage, express delivery, and critical infrastructure services such as terminals. Competing international networks of increasingly multiservice logistics providers offer ever more diversified solutions for trade, commerce, and manufacturing. Indeed, the annual turnover generated by these global networks exceeds US\$4.3 trillion.<sup>4</sup>

The role of logistics in the global economy is better recognized today than it was 10 years ago. Good logistics services reduce the cost of trade. Logistics performance is about how efficiently supply chains connect firms to domestic and international opportunities. The LPI tries to capture how logically accessible, or how well connected to the physical internet of global logistics, a country is. It includes several dimensions that will be developed in this report.

Logistics is business to business (B2B): its activities are executed primarily by private companies for private companies. For this reason, the LPI relies directly on the knowledge of logistics professionals worldwide (box 1.1). But the performance of logistics in each economy depends on the public sector’s interventions and policies—that was the main message of the initial 2007 LPI report, and it remains true today. Public features include regulation; transportation infrastructure; the implementation of controls, especially for international goods (as in trade facilitation); and the quality of

public–private partnership and dialogue. Previous *Connecting to Compete* reports have emphasized that better policies lead to better logistics performance.

Since the LPI was launched, gaps in performance have persisted between low-performing countries and high-performing ones, mostly in Europe and East Asia, where logistics has developed into an important service sector. The importance of logistics-related policies in enhancing performance is more recognized today than in 2007, and the policy focus has evolved. Initially, logistics policies focused on trade facilitation and removal of border bottlenecks. Today, such international logistics issues are difficult to separate from domestic ones. And policy makers and stakeholders deal with a wider range of policies, increasingly with safety and sustainability in mind. Emerging policy concerns include spatial planning, greening the supply chain, and bolstering the resilience of the supply chain to disruption or disasters (physical or digital) (see section 3). And skills and training resources have recently received more attention.

The growing scope of logistics performance and increasing recognition of its contribution to growth and economic integration call for holistic policies. More and more countries, especially emerging economies, see logistics as a sector of the economy requiring consistent policy making that cuts across traditional logistics areas. Previous LPI reports have referred to many countries having set up national strategies or dedicated organizations advancing logistics, such as Canada, China, France, Indonesia, Morocco, the Netherlands, and Thailand. For the 2018 edition, the examples include Oman (see box 3.3 in section 3) and India, which in 2017 set up a dedicated logistics body under a Special Secretary.

### The six components of the international Logistics Performance Index

The World Bank's Logistics Performance Index (LPI) analyzes countries through six indicators:

1. The efficiency of customs and border management clearance.
2. The quality of trade- and transport-related infrastructure.
3. The ease of arranging competitively priced international shipments.
4. The competence and quality of logistics services.
5. The ability to track and trace consignments.
6. The frequency with which shipments reach consignees within the scheduled or expected delivery time.

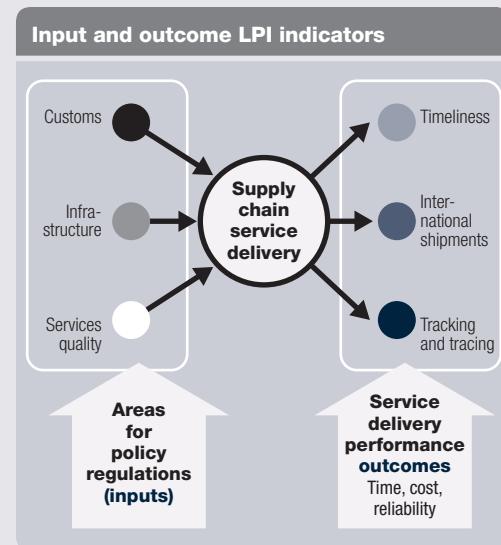
The components were chosen based on theoretical and empirical research and on the practical experience of logistics professionals involved in international freight forwarding. The figure maps the six LPI indicators onto two main categories:

- 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 (see appendix 5 for a detailed description of how the LPI is calculated).<sup>a</sup> This single indicator can be used to compare countries, regions, and income groups.

Because operators on the ground can best assess the vital aspects of logistics performance, the LPI relies on an 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 best positioned to assess how countries perform. Their views matter because they directly affect the choice of shipping routes and gateways, thereby influencing the decisions of firms to locate production, choose suppliers, and select target markets. Their participation is thus central to the LPI's quality and credibility.



See the 2018 LPI questionnaire at [www.worldbank.org/lpi](http://www.worldbank.org/lpi).

- a. In all six editions of the LPI (2007, 2010, 2012, 2014, 2016, and 2018), statistical aggregation has produced an overall index close to the simple average of country scores across the six LPI components.

### Guidelines on how to use the LPI and how to interpret it

Since 2007, LPI findings have become standard reference material in numerous studies and policy papers on trade logistics. The LPI has been adopted by several countries as a key performance indicator in their national transport or logistics strategies. It is also used as a subset of transport or logistics key performance indicators by the European Union, the Association of Southeast Asian Nations, Asia-Pacific Economic Cooperation, and others. (See more in box 3.1 in section 3). This makes it important to highlight how best to use the LPI and its indicators to avoid possible misinterpretations (box 1.2).

First, LPI data are gathered through a worldwide survey of logistics professionals on

how easy or difficult they experience trade logistics along six generic dimensions when dealing with eight preselected countries (see box 1.1 and the LPI methodology in appendix 5). As a survey, the LPI is subject to sampling error, diverging opinions of the respondents, and variation of the respondent base from one LPI report to the next. The number of evaluations received per country may also vary a lot.

So, it is important to check the confidence interval (CI) of a country's LPI scores before making any deeper judgment: the narrower the CI, the more reliable the score. Large traders, such as China, Germany, the United Kingdom, and the United States, tend to have a CI at 0.05 score points or below, which is about 1 percent or less of their scores. By contrast, some smaller traders' CIs are often closer to 0.5 score points, which may be more than 15 percent of their

Although the LPI and its components now offer the most comprehensive and comparable data on country logistics and trade facilitation environments, they have a limited domain of validity because of the limited experience of survey respondents and, for landlocked countries and small island states, the dependence of their logistics on the logistics of other countries.

To account for the sampling error created by the LPI's survey-based dataset, LPI scores are presented with approximate 80 percent confidence intervals (see appendix 5). These intervals yield upper and lower bounds for a country's LPI score and rank. Upper bounds for LPI ranks are calculated by increasing a country's LPI score to its upper bound while maintaining all other country scores constant and then recalculating LPI ranks. An analogous procedure is adopted for lower bounds.

Confidence intervals must be carefully examined to determine whether a change in score or a difference between two scores is statistically significant. An improvement in a country's performance should be considered statistically significant only if the lower bound of its 2018 LPI score exceeds the upper bound of its 2016 score. Because of the LPI's limited domain of validity and the need for

confidence intervals to account for sampling error, a country's exact ranking might be less relevant to policy makers than its proximity to others in a wider performance group or its statistically significant improvement. Still, a close examination of the distribution of changes in ranking indicates that they have behaved similarly across all six editions of the index.

To provide a bigger, better-balanced picture of country performance, this report publishes the current 2018 results alongside a composite score of the four latest surveys (2012–18). This approach reduces the noise and random variation from one LPI survey to another and enhances the comparison of aggregate scores for the 167 countries in the 2018 edition. In the aggregate data for the four latest LPI surveys, 41 countries scored 70 percent or more of the top performer's score. For these, the average difference per rank position was 0.023 score points. For the next 61 countries scoring 50–69 percent of the top performer's score and occupying ranks 42–102, the average difference per rank was 0.016 score points. This means that countries at similar performance levels may have substantially different ranks, especially in the middle range.

scores. Changes can be statistically significant only if the CIs for the scores of two consecutive years do not overlap.

Second, the overall LPI score is a more telling indicator than the LPI rank, because scores are more accurate and provide a better basis for comparison over time. Especially for countries ranked in the middle range, scores may differ little even if rank positions can be quite far apart: for example, Egypt, ranked 60th, and Bangladesh, ranked 100th, both fall within 0.36 score points, an interval where the average difference per country is only 0.0088 score points. Thus, the fluctuation in a country's rank from one LPI report to the next may appear much larger than the actual change in its score.

For this reason, the 2018 LPI uses the weighted average LPI score as the primary indicator, taking away much of the oscillation in scores from one LPI to another. The weighted average values of the four most recent LPI surveys were provided in appendix 4 in the 2014 and 2016 LPI reports, too. Using the aggregate values and following their development over time provides a more balanced picture of a country's logistics performance than relying solely on single-year data. For El Salvador, for instance,

with aggregate values, the maximum interval of both score (0.18 score points) and rank changes (20 rank positions) are about half of what they are with single-year scores and ranks (0.38 score points and 37 rank positions) in the interval covering the LPI reports in 2012, 2014, 2016, and 2018.

Third, the direction of trade in the international LPI is important to the countries being evaluated. In addition, the traded products covered could be labeled "general merchandise," so the responses provide less information on goods that require specific care, such as pharmaceuticals, food, and those labeled as dangerous. Furthermore, the respondents are freight forwarders, express carriers, and logistics providers (by road, rail, shipping, and air transport).

Consequently, manufactured products transported in unitized form make up the core of trade covered, where freight forwarders are typically used as intermediaries. Trade of large volumes of raw materials and energy products handled in bulk (such as ores, grain, oil, and gas) is not covered well in the LPI. Such large-volume trade uses either direct industry buyer-seller channels or another type of intermediaries, such as commodity traders or shipping brokers.

The LPI is best used as a snapshot of where a country stands on logistics, and it can serve as an entry point to a more comprehensive assessment of a country's logistics performance

Fourth, especially in poor countries, traditional operators often play a larger role in trade arrangements than international freight forwarders. Traditional and international operators may differ in their interactions with government agencies, and in their service levels. In developing countries, international networks tend to serve large companies, which may have significantly different service level criteria for time, cost, and other aspects from traditional trading networks.

Fifth, for most landlocked countries and small island states, the LPI might reflect access problems outside the country assessed, such as transit difficulties. The rating of a landlocked country might not adequately assess its trade facilitation reform efforts, because their success depends on international transit routes through its neighbors.

In summary, individual country data—especially rank positions tracked from one LPI report to the next—should preferably not be used as the sole indicator, but should be considered in combination with scores, while also keeping the size of the CI in mind. Using the weighted aggregate score and rank data that rely on the four latest LPI ratings is also a good idea, as they provide a more balanced picture. Furthermore, very few improvements in a country's operational or regulatory environment immediately affect the global freight forwarding and logistics professionals view on that country. However, some negative developments, such as a devastating natural catastrophe or an outbreak of a serious and wide-spread armed conflict may impact a country's ratings more quickly than any positive changes. Put differently: positive changes tend to take more time, while some (extreme) negative ones might have a more sudden impact.

The LPI has been effective at galvanizing interest in and making the case for reform in several countries. It is best used as a snapshot of where a country stands on logistics, and it can serve as an entry point to a more comprehensive assessment of a country's logistics performance. This can entail, for instance, assessments of the different transport modes (road, rail, air, maritime, and inland shipping), internal logistics, dwell time studies, and an assessment

of professional skills and training in the logistics sector.

## Features of the 2018 survey

The 2018 LPI survey employed the same methodology as the previous five editions of Connecting to Compete: a standardized questionnaire with two parts, international and domestic. In the international questionnaire, respondents evaluate six indicators of logistics performance in up to eight of their main overseas partner countries (see box 1.1 for the six indicators). In the domestic questionnaire, respondents are asked to provide qualitative and quantitative data for the logistics environment in the country where they work.

In 2018, almost 6,000 country assessments were made by logistics professionals. This edition covers 160 countries in the international LPI and 100 countries in the domestic LPI. The report provides new insights on cybersecurity threats in logistics and the use of electronic trading platforms by shippers.

Given that the LPI captures a broad range of factors affecting performance, the results show clear benefits, particularly for developing countries, in moving forward on a broad range of fronts to improve logistics. Evidence suggests that improvements in logistics performance boost the integration of countries in global trade (box 1.3).

## Key findings of the 2018 international Logistics Performance Index

Over the past several years, high-income countries, most of which are in Europe, occupied the top 10 positions in the LPI rankings (table 1.1). Not surprising, since these countries traditionally have been dominant in the supply chain industry.

The composition of the 15 best-performing countries has not significantly changed either. But it is worth highlighting major improvements in the LPI scores of Japan, Denmark, the United Arab Emirates, and New Zealand since 2012.

Box 1.3

### Logistics performance boosts trade integration, but by just how much?

The LPI has now been available for several years, which makes it possible to estimate a trade model using more than one year of data. The approach controls for unobservable and observable factors that vary by country and time, as well as by country pair, and isolates the impact of logistics performance.

Shepherd (forthcoming) implements such an approach using data for 63 exporters and importers that together account for 93 percent of world GDP and a similar proportion of world trade. Regression results show that a 1 point improvement in a country's LPI score increases trade by 16 percent, before accounting for relative price effects.

He then uses the same model to consider a catch-up scenario, in which all countries narrow the logistics gap between themselves and the leading country by 20 percent, but all other factors remain constant. Total world real GDP (a proxy for economic welfare) would increase by 0.1 percent. Trade effects would be an order of magnitude larger. In relative terms, the largest welfare gains are typically in developing countries such as Cambodia (0.7 percent), Costa Rica (0.4 percent), and Tunisia (0.4 percent). All these welfare impact figures are lower bounds, since they do not take into account intersectoral linkages in production, which are known to produce substantially higher results.

**Source:** Shepherd forthcoming.

Table 1.1 Top 10 LPI economies, 2018

| Economy        | 2018 |       | 2016 |       | 2014 |       | 2012 |       |
|----------------|------|-------|------|-------|------|-------|------|-------|
|                | Rank | Score | Rank | Score | Rank | Score | Rank | Score |
| Germany        | 1    | 4.20  | 1    | 4.23  | 1    | 4.12  | 4    | 4.03  |
| Sweden         | 2    | 4.05  | 3    | 4.20  | 6    | 3.96  | 13   | 3.85  |
| Belgium        | 3    | 4.04  | 6    | 4.11  | 3    | 4.04  | 7    | 3.98  |
| Austria        | 4    | 4.03  | 7    | 4.10  | 22   | 3.65  | 11   | 3.89  |
| Japan          | 5    | 4.03  | 12   | 3.97  | 10   | 3.91  | 8    | 3.93  |
| Netherlands    | 6    | 4.02  | 4    | 4.19  | 2    | 4.05  | 5    | 4.02  |
| Singapore      | 7    | 4.00  | 5    | 4.14  | 5    | 4.00  | 1    | 4.13  |
| Denmark        | 8    | 3.99  | 17   | 3.82  | 17   | 3.78  | 6    | 4.02  |
| United Kingdom | 9    | 3.99  | 8    | 4.07  | 4    | 4.01  | 10   | 3.90  |
| Finland        | 10   | 3.97  | 15   | 3.92  | 24   | 3.62  | 3    | 4.05  |

Source: Logistics Performance Index 2012, 2014, 2016, and 2018.

The bottom 10 countries in the ranking are mostly low-income and lower-middle-income countries in Africa or isolated areas (table 1.2). These are either fragile economies affected by armed conflict, natural disasters, and political unrest or landlocked countries naturally challenged by geography or economies of scale in connecting to global supply chains.

The overall group composition among the top-performing upper-middle-income economies has changed marginally, with China, Thailand, and South Africa leading the group, and Croatia and Bulgaria improving in their LPI ranking (table 1.3).

Among lower-middle-income countries, large economies such as India and Indonesia

and emerging economies such as Vietnam stand out as top performers. Most either have access to the sea or are located close to major transportation hubs (table 1.4).

Among low-income countries, countries in East and West Africa are leading performers in the 2018 report (table 1.5).

Figure 1.1 displays the cumulative distribution of LPI scores. The vertical lines represent the boundaries of LPI quintiles: five groups containing the same number of countries rated in the LPI. The bottom quintile includes countries with the lowest LPI scores, while the top quintile includes countries with the highest scores. As in past LPI reports, the range of scores in the third and fourth quintiles

**Table 1.2 | Bottom 10 LPI economies, 2018**

| Economy                  | 2018 |       | 2016 |       | 2014 |       | 2012 |       |
|--------------------------|------|-------|------|-------|------|-------|------|-------|
|                          | Rank | Score | Rank | Score | Rank | Score | Rank | Score |
| Afghanistan              | 160  | 1.95  | 150  | 2.14  | 158  | 2.07  | 135  | 2.30  |
| Angola                   | 159  | 2.05  | 139  | 2.24  | 112  | 2.54  | 138  | 2.28  |
| Burundi                  | 158  | 2.06  | 107  | 2.51  | 107  | 2.57  | 155  | 1.61  |
| Niger                    | 157  | 2.07  | 100  | 2.56  | 130  | 2.39  | 87   | 2.69  |
| Sierra Leone             | 156  | 2.08  | 155  | 2.03  | na   | na    | 150  | 2.08  |
| Eritrea                  | 155  | 2.09  | 144  | 2.17  | 156  | 2.08  | 147  | 2.11  |
| Libya                    | 154  | 2.11  | 137  | 2.26  | 118  | 2.50  | 137  | 2.28  |
| Haiti                    | 153  | 2.11  | 159  | 1.72  | 144  | 2.27  | 153  | 2.03  |
| Zimbabwe                 | 152  | 2.12  | 151  | 2.08  | 137  | 2.34  | 103  | 2.55  |
| Central African Republic | 151  | 2.15  | na   | na    | 134  | 2.36  | 98   | 2.57  |

na is not available.

Source: Logistics Performance Index 2012, 2014, 2016, and 2018.

**Table 1.3 | Top-performing upper-middle-income economies, 2018**

| Economy      | 2018 |       | 2016 |       | 2014 |       | 2012 |       |
|--------------|------|-------|------|-------|------|-------|------|-------|
|              | Rank | Score | Rank | Score | Rank | Score | Rank | Score |
| China        | 26   | 3.61  | 27   | 3.66  | 28   | 3.53  | 26   | 3.52  |
| Thailand     | 32   | 3.41  | 45   | 3.26  | 35   | 3.43  | 38   | 3.18  |
| South Africa | 33   | 3.38  | 20   | 3.78  | 34   | 3.43  | 23   | 3.67  |
| Panama       | 38   | 3.28  | 40   | 3.34  | 45   | 3.19  | 61   | 2.93  |
| Malaysia     | 41   | 3.22  | 32   | 3.43  | 25   | 3.59  | 29   | 3.49  |
| Turkey       | 47   | 3.15  | 34   | 3.42  | 30   | 3.50  | 27   | 3.51  |
| Romania      | 48   | 3.12  | 60   | 2.99  | 40   | 3.26  | 54   | 3.00  |
| Croatia      | 49   | 3.10  | 51   | 3.16  | 55   | 3.05  | 42   | 3.16  |
| Mexico       | 51   | 3.05  | 54   | 3.11  | 50   | 3.13  | 47   | 3.06  |
| Bulgaria     | 52   | 3.03  | 72   | 2.81  | 47   | 3.16  | 36   | 3.21  |

Source: Logistics Performance Index 2012, 2014, 2016, and 2018.

**Table 1.4 | Top-performing lower-middle-income economies, 2018**

| Economy          | 2018 |       | 2016 |       | 2014 |       | 2012 |       |
|------------------|------|-------|------|-------|------|-------|------|-------|
|                  | Rank | Score | Rank | Score | Rank | Score | Rank | Score |
| Vietnam          | 39   | 3.27  | 64   | 2.98  | 48   | 3.15  | 53   | 3.00  |
| India            | 44   | 3.18  | 35   | 3.42  | 54   | 3.08  | 46   | 3.08  |
| Indonesia        | 46   | 3.15  | 63   | 2.98  | 53   | 3.08  | 59   | 2.94  |
| Côte d'Ivoire    | 50   | 3.08  | 95   | 2.60  | 79   | 2.76  | 83   | 2.73  |
| Philippines      | 60   | 2.90  | 71   | 2.86  | 57   | 3.00  | 52   | 3.02  |
| Ukraine          | 66   | 2.83  | 80   | 2.74  | 61   | 2.98  | 66   | 2.85  |
| Egypt, Arab Rep. | 67   | 2.82  | 49   | 3.18  | 62   | 2.97  | 57   | 2.98  |
| Kenya            | 68   | 2.81  | 42   | 3.33  | 74   | 2.81  | 122  | 2.43  |
| Lao PDR          | 82   | 2.70  | 152  | 2.07  | 131  | 2.39  | 109  | 2.50  |
| Jordan           | 84   | 2.69  | 67   | 2.96  | 68   | 2.87  | 102  | 2.56  |

Source: Logistics Performance Index 2012, 2014, 2016, and 2018.

Table 1.5

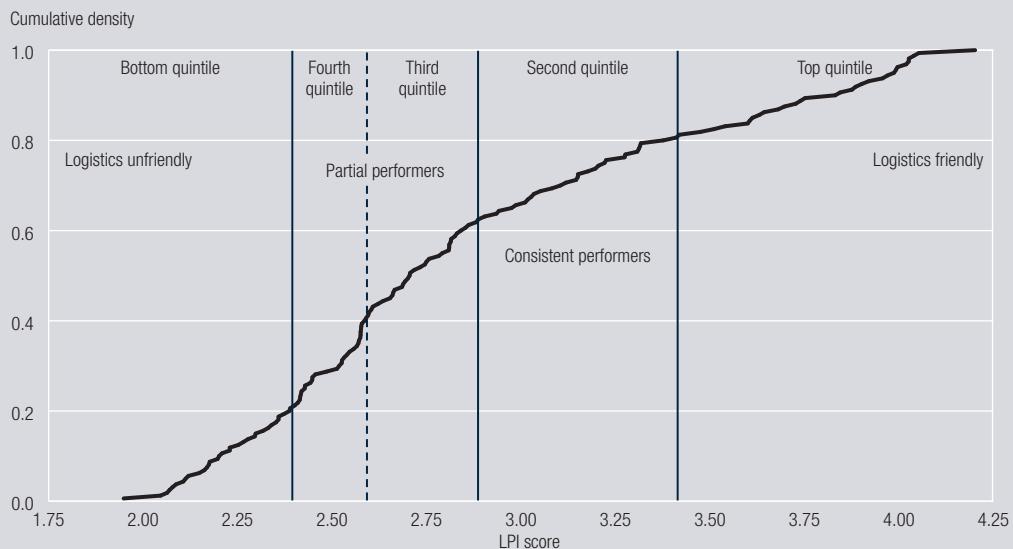
**Top-performing low-income economies, 2018**

| Economy          | 2018 |       | 2016 |       | 2014 |       | 2012 |       |
|------------------|------|-------|------|-------|------|-------|------|-------|
|                  | Rank | Score | Rank | Score | Rank | Score | Rank | Score |
| Rwanda           | 57   | 2.97  | 62   | 2.99  | 80   | 2.76  | 139  | 2.27  |
| Benin            | 76   | 2.75  | 115  | 2.43  | 109  | 2.56  | 67   | 2.85  |
| Burkina Faso     | 91   | 2.62  | 81   | 2.73  | 98   | 2.64  | 134  | 2.32  |
| Mali             | 96   | 2.59  | 109  | 2.50  | 119  | 2.50  | na   | na    |
| Malawi           | 97   | 2.59  | na   | na    | 73   | 2.81  | 73   | 2.81  |
| Uganda           | 102  | 2.58  | 58   | 3.04  | na   | na    | na   | na    |
| Comoros          | 107  | 2.56  | 98   | 2.58  | 128  | 2.40  | 146  | 2.14  |
| Nepal            | 114  | 2.51  | 124  | 2.38  | 105  | 2.59  | 151  | 2.04  |
| Togo             | 118  | 2.45  | 92   | 2.62  | 139  | 2.32  | 97   | 2.58  |
| Congo, Dem. Rep. | 120  | 2.43  | 127  | 2.38  | 159  | 1.88  | 143  | 2.21  |

na is not available.

Source: Logistics Performance Index 2012, 2014, 2016, and 2018.

Figure 1.1

**Cumulative distribution of LPI scores, 2018**

Source: Logistics Performance Index 2018.

is similar. This means that country LPI scores are closer to each other and that any change in the country's performance (and that of its neighbors) will generate larger changes in the ranking relative to countries in other quintiles (see box 1.2).

As in previous reports, LPI scores are broken down into four categories, consistent with the score quintiles, used in all editions of *Connecting to Compete*:

- *Logistics-unfriendly*: Includes countries with severe logistics constraints, such as the least developed countries (bottom LPI quintile).
- *Partial performers*: Includes countries with a level of logistics constraints most often seen in low- and middle-income countries (third and fourth LPI quintiles).
- *Consistent performers*: Includes countries rated better on logistics performance than most others in their income group (second LPI quintile).

- *Logistics-friendly:* Includes top-performing countries, most of which are in the high-income group (top LPI quintile).

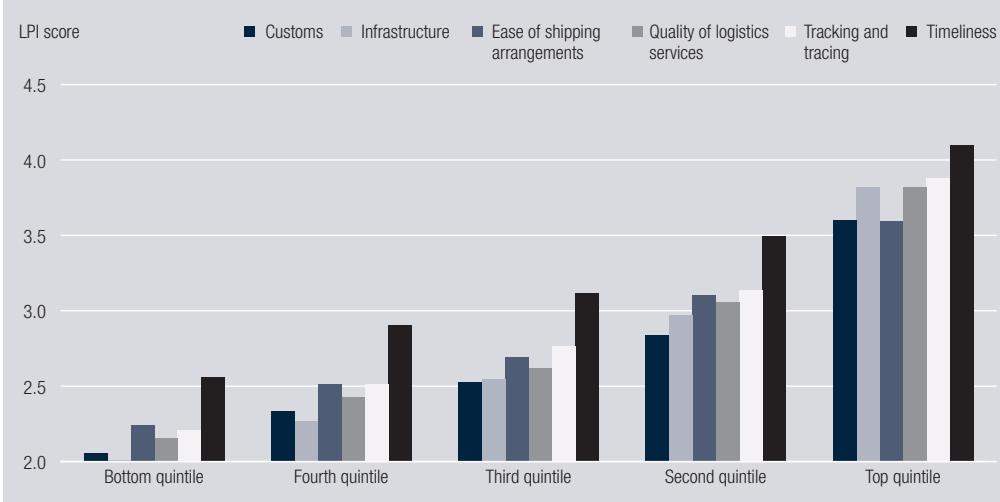
### **Logistics performance is strongly correlated with the quality of service**

Several trends observed in past LPI reports still hold. There are significant differences in LPI performance across LPI components and quintiles (figure 1.2). The timeliness component seems to outperform the other LPI components and is generally viewed as the least problematic. On the other hand, the performance of customs and border agencies, as well as the quality of trade and transport infrastructure, are particularly low in the worst-performing countries,

which also have relatively low quality of logistics services.

In addition, table 1.6 shows which of the six LPI components of the international LPI are above or below the overall index. A positive entry indicates that an LPI component score is higher than a group's overall international LPI score, and a negative entry indicates that the component score is lower than the group's overall score. Several observations stand out. Customs and border agencies continue to underperform compared with other LPI components. As in past reports, except for the top quintile, the quality of trade and transport infrastructure score and the quality of logistics services score are below the overall LPI score. Across the three lowest quintiles, the tracking and tracing component is a little below than the overall score, as in past reports.

**Figure 1.2 | LPI components score, by LPI quintile, 2018**



**Table 1.6 | Deviation on each component from the overall LPI score, by quintile**

| Quintile        | Customs | Infrastructure | Ease of shipping arrangements | Quality of logistics services | Tracking and tracing | Timeliness |
|-----------------|---------|----------------|-------------------------------|-------------------------------|----------------------|------------|
| Bottom quintile | -0.16   | -0.19          | 0.04                          | -0.05                         | -0.02                | 0.34       |
| Fourth quintile | -0.14   | -0.19          | 0.01                          | -0.09                         | -0.01                | 0.39       |
| Third quintile  | -0.20   | -0.19          | 0.02                          | -0.07                         | -0.01                | 0.42       |
| Second quintile | -0.24   | -0.12          | -0.01                         | -0.07                         | 0.02                 | 0.40       |
| Top quintile    | -0.18   | 0.02           | -0.19                         | 0.00                          | 0.07                 | 0.31       |

Source: Logistics Performance Index 2018.

Note: All calculations are based on the weighted average score for the LPI and its components over 2012–18.

In past reports, average country LPI scores were generally improving. But in 2018, low-income countries experienced a drop in the LPI scores for quality of infrastructure, customs performance, and quality of logistics services, as lower-middle-income countries' scores on these three LPI components improved (figure 1.3).<sup>5</sup> Progress can be also tracked on the environment for logistics since the last LPI edition (table 1.7). Contrary to past reports, respondents report improved scores for the bottom two quintiles in ICT infrastructure and in private logistics services—possibly due to ICT infrastructure improvements in the past decade. For low-income countries, streamlining border clearance procedures and ensuring access to physical trade and transport infrastructure will continue to be priority issues.

## Logistics performance is more than income

There is still a noticeable gap in LPI scores between high- and low-income countries. High-income countries, on average, surpass low-income countries by 48 percent in their LPI scores. Among the 30 top-performing countries, 24 are members of the Organization for Economic Co-operation and Development (OECD), a proportion that has not changed much since past LPI reports. Even so, countries such as China, India, Rwanda, Thailand, and Vietnam outperform their income group peers (figure 1.4). That is why income alone cannot explain why performance varies widely among countries in certain income groups. On the other

High-income countries, on average, surpass low-income countries by 48 percent in their LPI scores

**Figure 1.3 | Change in LPI component score by income group, 2016–18**

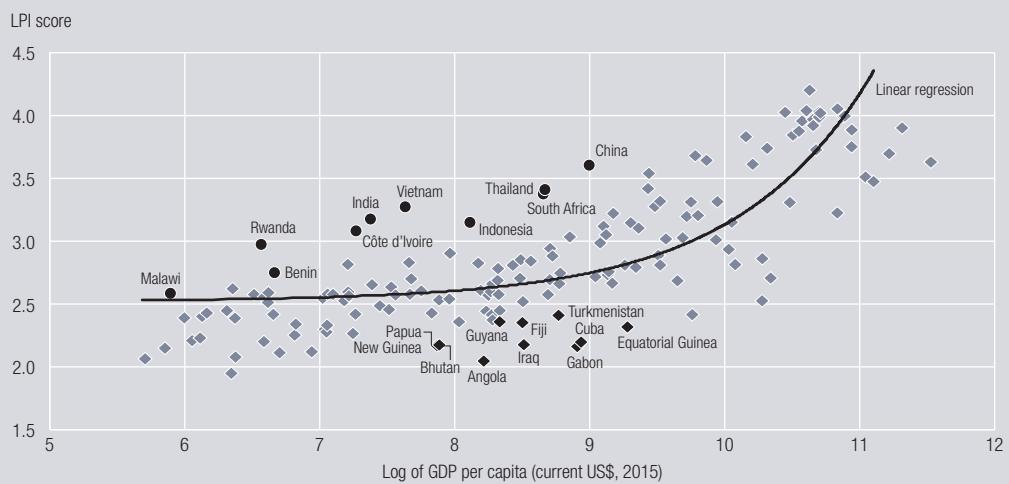


**Table 1.7 | Respondents reporting an “improved” or “much improved” logistics environment since 2015, by LPI quintile**

| Component                          | Bottom quintile | Fourth quintile | Third quintile | Second quintile | Top quintile |
|------------------------------------|-----------------|-----------------|----------------|-----------------|--------------|
| Customs                            | 61              | 63              | 44             | 68              | 62           |
| Other border procedures            | 69              | 43              | 36             | 60              | 49           |
| Trade and transport infrastructure | 65              | 40              | 45             | 66              | 53           |
| ICT infrastructure                 | 54              | 69              | 62             | 69              | 67           |
| Private logistics services         | 55              | 82              | 61             | 69              | 65           |
| Logistics regulation               | 57              | 39              | 36             | 53              | 31           |
| Incidence of corruption            | 39              | 34              | 45             | 56              | 35           |

Source: Logistics Performance Index 2018.

Figure 1.4

**LPI overperformers and underperformers**

Source: Logistics Performance Index 2018.

Note: Fitted values are based on an ordinary least squares regression using data for all countries. Underperformers (black diamonds) are the non-high-income countries with the 10 smallest residuals. Overperformers (black circles) are the non-high-income countries with the 10 largest residuals.

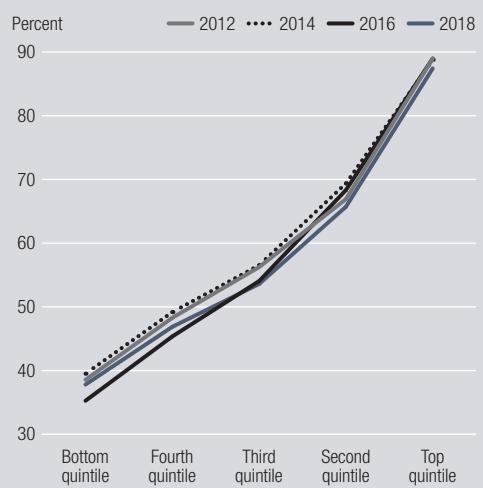
hand, the mostly resource-rich countries—Angola, Gabon, Equatorial Guinea, Iraq, and Turkmenistan—underperform their income group peers.

### Trends over the past four reports

The gap in relative LPI scores—the scores as a percentage of the leading country's score—is quite similar to the gap revealed in past editions of *Connecting to Compete*. The average relative score of the three lowest quintiles was higher than in the past three LPI reports (figure 1.5). In 2018, the worst relative performer is Afghanistan, at 29.6 percent of best performer Germany's score. In 2016, the worst performer was the Syrian Arab Republic, at 19 percent. In 2014, the worst was Somalia, at 25 percent.

The correlation between the 2016 and 2018 LPI scores is a bit stronger than those between past reports, with 0.93 in scores and 0.90 in rankings (compared with 0.91 in scores and 0.86 in rankings between 2012 and 2014). Keep in mind that the data are survey-based and thus are prone to sampling errors. Statistically significant changes are revealed only if the confidence intervals for the 2016 and 2018 scores do not overlap.

Figure 1.5

**LPI score as a percentage of the best performer, 2012–18**

Source: Logistics Performance Index 2012, 2014, 2016, and 2018.

### Weighted international LPI scores and ranks 2012–18

As in the past two reports, the scores of the six LPI components across the four latest surveys were used to provide a bigger and better-balanced picture of a country's performance. This approach is believed to reduce the noise and random variation across different LPI surveys, and thus enhances the comparison of the 167

countries. In the 2018 report, the four previous scores on each component were weighted as follows: 6.7 percent for 2012, 13.3 percent for 2014, 26.7 percent for 2016, and 53.3 percent for 2018 (so the more recent data carry more weight). This method is identical to the one used in the 2014 and 2016 reports, which used the data for the prior four LPI reports.

The opportunity to use weighted values is important because an individual country's score and, consequently, its rank can oscillate a lot, even though the change might not be statistically significant. That happened to several countries' scores in 2014–16, especially those with a wide confidence interval, indicating disagreement among the respondents. The effect tends to be amplified if the number of observations is low, as is frequent in smaller countries. Large traders, such as China, Germany, the United Kingdom, and the United States had confidence intervals of 0.05 score points or less in 2018, 1 percent or less of their corresponding LPI scores. By contrast, Yemen, with a confidence interval of 0.44, Iceland with 0.42, Niger with 0.41, and Malta with 0.39 had the largest confidence intervals, more than 13 percent of their scores.

In the aggregate 2012–18 LPI, Germany scores highest at 4.19 (4.17 for the aggregate 2010–16 LPI and 4.10 for 2007–14), followed by the Netherlands 4.07 (4.12 for 2010–16 and 4.05 for 2007–14), Sweden 4.07 (4.08 for 2010–16 and 3.95 for 2007–14), Belgium 4.05 (4.06 for 2010–16 and 4.0 for 2007–14), and Singapore 4.05 (4.10 in 2010–16 and 4.06 in 2007–14). Germany and the Netherlands continue to dominate the top three, while Singapore fell from third to fifth. Of the 28 European Union member states, 15 are among the top 30 countries, and of the 34 OECD members, 24 are among the top 30. The non-OECD economies in the top 30 are Singapore (5th) Hong Kong, SAR, China (9th), United Arab Emirates (14th), Taiwan, China (24th), China (27th), South Africa (29th), and Qatar (30th). All but two of the top 30 are high-income countries; the other two, China and South Africa, are upper-middle-income countries.

As in 2010–16, all OECD countries are in the top third. In the previous 2007–14 LPI aggregate, all European Union member states were in the top third. Bulgaria fell narrowly outside this category in the aggregate LPI scores for 2012–18 (3.0, ranked 57th) and 2010–16 (2.96, ranked 62th). Romania, by contrast, rose from a 2010–16 score of 3.05, ranked 56th, to a 2012–18 score of 3.09, ranked 50th.

In the aggregate international LPI for 2012–18, Somalia again scores the lowest at 2.00, ranked 167th (it scored 1.67 in 2010–16 and 1.62 in 2007–14). Despite some convergence since the 2007 LPI, the logistics gap between high- and low-income countries persists. As in the previous surveys, the countries with the weakest performance in 2018 are least developed countries or small island countries, some also conflict-ridden. Haiti occupies the second-lowest rank with a score of 2.02 (it scored 1.96 in 2010–16 and 2.24 in 2007–14). Other countries that score the lowest on logistics include Afghanistan with a score of 2.04 (2.15 in 2010–16 and 2.10 in 2007–14), Sierra Leone with 2.06 (2.04 in 2010–16 and 2.06 in 2007–14), and the Syrian Arab Republic with 2.10 (1.94 in 2010–16 and 2.31 in 2007–14). Broadly speaking, the converging countries—ranking, roughly, from 40th to 120th—have scores separated by only a few decimal points. Thus, some large changes in rank might be witnessed in this middle ground, even though the underlying score changes are marginal.

Despite some convergence since the 2007 LPI, the logistics gap between high- and low-income countries persists

## **Changes in countries' LPI scores 2016–18**

Changes in the LPI score reflect negative or positive private sector perceptions of logistics performance. The LPI score is thus not purely a metric of current performance. It incorporates expectations, trends, and the perceived pace of improvement. This can create a rebound effect from one survey to the next. For example, a country with large positive changes in one survey may be adjusted downward the next time because positive changes were perceived as happening more slowly than anticipated during the preceding survey.

Table 1.8

Number of countries with positive and negative changes in LPI scores, 2016–18

| Change in LPI score, 2016–18             | Low income | Lower middle income | Upper middle income | High income |
|--|------------|---------------------|---------------------|-------------|
| Positive and statistically significant   | 1          | 4                   | 0                   | 0           |
| Positive (not statistically significant) | 11         | 18                  | 23                  | 14          |
| No change                                | 0          | 0                   | 1                   | 0           |
| Negative (not statistically significant) | 10         | 16                  | 13                  | 32          |
| Negative and statistically significant   | 1          | 3                   | 2                   | 5           |

Source: Logistics Performance Index 2016 and 2018.

Note: The 2018 LPI includes 160 countries, of which 6 were not included in the 2016 edition and are thus not included in this table. Twelve countries had different income classifications in 2018 than in 2016; in all cases the 2018 classification was used. Differences in scores were rounded to two positions after the decimal point.

The LPI score depends primarily on industry perceptions of relative performance. Even a country that is making improvements can see its score affected by the perceived impact or speed of improvements in other countries. Planned improvements to a country's logistics environment can temporarily lower a country's LPI score. For example, even if relocation from an old port to a new one is managed efficiently, it is likely that the logistics industry will expect or experience disruptions in supply chains during the adjustment.

LPI assessments may also be influenced by respondents' own experiences and the types of cargo they handle. Logistics for oil, gas, mining, or industrial projects are likely to be smoother and more homogeneous worldwide than exports of goods for local consumption, which go through traditional logistics and distribution channels. For large countries with sizable domestic markets and associated domestic logistics systems—such as China and India—the LPI is biased toward the performance of the main import gateways. It does not capture the

performance of internal logistics and domestic commerce corridors linking economic centers across provincial or state boundaries. And survey respondent demographics can affect a perception-based survey such as the LPI.

Score changes from one edition of the LPI to the next should be interpreted with care. However, negative trends across all years, not just two, may be something to worry about—especially when a country's score changes by more than 20%. Connecting to Compete always includes the statistical confidence interval for each country's International LPI (see appendix 2). Statistically significant changes occur only if the confidence intervals for the 2018 and 2016 scores do not overlap. Table 1.8 gives an overview of the number of countries in the 2018 index whose LPI score changed, either negatively or positively.

While the finding is not statistically significant, it is noteworthy that slightly more low- and middle-income countries had LPI scores rise (34) than fall (30) between 2016 and 2018.

# SECTION 2

# Unbundling logistics performance

The international Logistics Performance Index (LPI) provides insights into the drivers of overall logistics performance. To unbundle the survey results, it is necessary to refer to the domestic LPI. This section is based on the domestic LPI, where surveyed logistics professionals assess the logistics environments in countries where they work. It contains more detailed information on countries' logistics environments, processes, and institutions and looks at the logistics constraints within countries, not just at gateways such as ports or borders. It analyzes countries by four major determinants of overall logistics performance: infrastructure, services, border procedures, and supply chain reliability. Unless otherwise stated, data are from the 2018 survey rather than aggregate data for 2012–18.

## Infrastructure: A shared concern across performance groups

Infrastructure is a major concern across all LPI performance groups except the top performers, but survey respondents signal improvements. The quality of information and communications technology (ICT) is consistently rated higher than physical transportation infrastructure.

Survey respondents in top-quintile countries rated their infrastructure far more highly than those in other quintiles did (table 2.1). Differences among the other four quintiles are less striking, especially for roads and rail. The difference between the top and bottom is smallest in ICT, suggesting that developing countries may have been investing heavily in modern technologies, perhaps even leapfrogging intermediate stages of performance. Of course, ICT cannot replace other hard infrastructure, which requires a renewed focus.

Though still a constraint in developing countries, infrastructure seems to be improving. Since the previous LPI survey, respondents from countries in all performance quintiles generally perceive improvements in trade and transport infrastructure (figure 2.1). For the first time since the survey began, the perception of improvement is higher in the bottom quintile than in the top one, though lower in the middle. If this pattern persists, it would be consistent with some closing of the logistics gap discussed in section 1.

It is also possible to compare respondents' ratings of infrastructure with the ratings in previous LPI reports. Table 2.1 shows clear evidence of increasing satisfaction with port infrastructure, since scores in 2018 are higher than in previous years, as they were in 2016 compared with 2014 in most quintiles. Although for other types of infrastructure the picture is mixed and varies by quintile, these results together with respondents' observations of improvement (see figure 2.1) clearly suggest that governments are aware of the importance of infrastructure quality for logistics performance and are working successfully to improve it.

Satisfaction with infrastructure quality varies by infrastructure type. As in previous years,

Table 2.1

**Respondents rating the quality of each infrastructure type "high" or "very high," by LPI quintile**

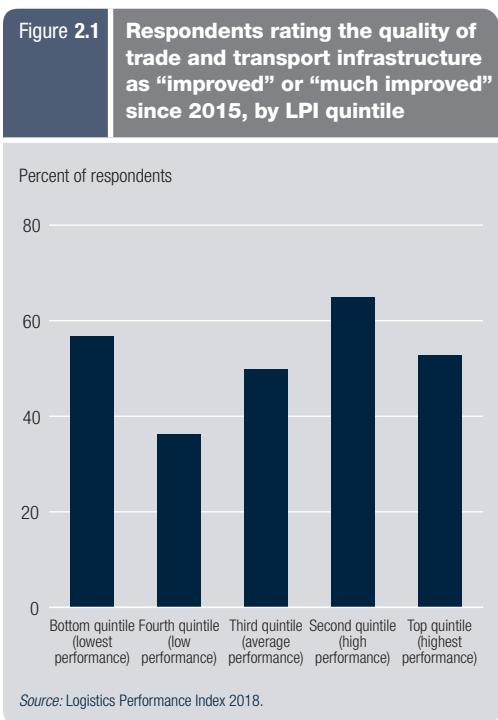
Percent of respondents

| LPI quintile    | Ports | Airports | Roads | Rail | Warehousing and transloading | ICT |
|-----------------|-------|----------|-------|------|------------------------------|-----|
| Bottom quintile | 26    | 30       | 17    | 17   | 21                           | 34  |
| Fourth quintile | 23    | 13       | 10    | 9    | 23                           | 44  |
| Third quintile  | 33    | 39       | 20    | 12   | 27                           | 48  |
| Second quintile | 57    | 41       | 37    | 11   | 37                           | 52  |
| Top quintile    | 63    | 67       | 57    | 37   | 62                           | 75  |

ICT is information and communications technology.

Source: Logistics Performance Index 2018.

ICT is consistently rated higher than physical infrastructure across performance quintiles, and rail infrastructure and services are rated lowest



respondents in all LPI quintiles are most satisfied with ICT infrastructure. As in 2016, there is evidence of a narrowing infrastructure gap, particularly between the top quintile and the bottom one, where the rate of improvement in 2018 seems noticeably faster than in 2016; improvement in the middle quintiles is on a par with that in earlier reports. Rail infrastructure, by contrast, but also in line with previous

reports, elicits general dissatisfaction. In the bottom quintile, infrastructure of all kinds fails to satisfy—an exception to the pattern in other quintiles of variation by infrastructure type.

Similar patterns emerge when the domestic LPI data on infrastructure are disaggregated by World Bank region, excluding high-income countries (table 2.2). The highest ratings are for ICT in all regions except the Middle East and North Africa, and Latin America and the Caribbean, where ICT ratings are very close to the highest. Ratings for other types of infrastructure vary more widely by region, but two features stand out. First, satisfaction with road and rail infrastructure is especially low in Latin America and the Caribbean, as in previous surveys, and also in South Asia, as in 2016. Second, satisfaction with rail infrastructure is low in all regions, as was the case for all LPI quintiles.

## Developing logistics services markets

The quality and competence of core logistics service providers are two other important parts of a country’s overall performance. Respondents in all LPI quintiles are nearly always more satisfied with service providers than with infrastructure quality (table 2.3, compared with table 2.1). Just as for infrastructure, for service

**Figure 2.2** Respondents rating the quality of each infrastructure type as “high” or “very high” by LPI quintile, 2014–18

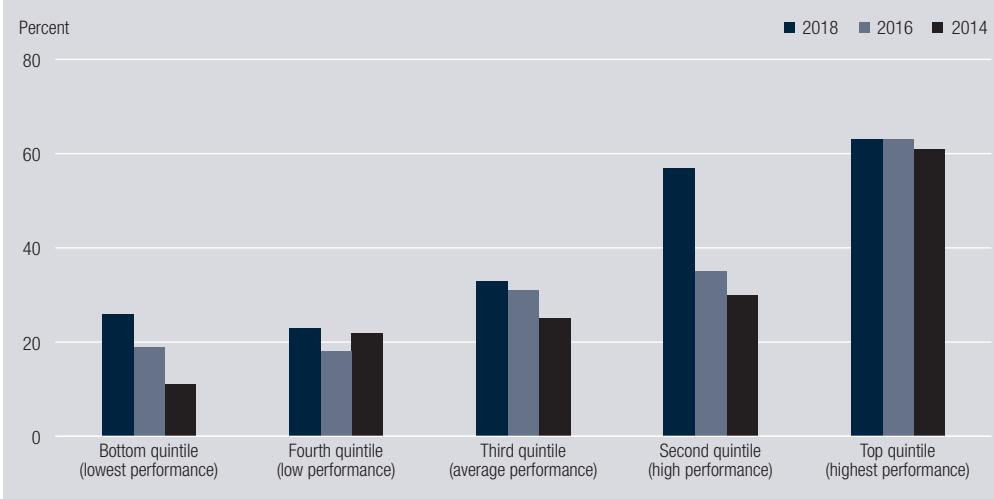


Table 2.2

**Respondents rating the quality of each infrastructure type “high” or “very high,” by World Bank developing country region**

Percent of respondents

| Region                       | Ports | Airports | Roads | Rail | Warehousing and transloading | ICT |
|------------------------------|-------|----------|-------|------|------------------------------|-----|
| East Asia and Pacific        | 33    | 36       | 33    | 10   | 33                           | 43  |
| Europe and Central Asia      | 14    | 22       | 21    | 20   | 23                           | 48  |
| Latin America and Caribbean  | 26    | 23       | 9     | 0    | 6                            | 26  |
| Middle East and North Africa | 70    | 53       | 45    | 12   | 56                           | 69  |
| South Asia                   | 18    | 14       | 7     | 10   | 7                            | 37  |
| Sub-Saharan Africa           | 45    | 39       | 17    | 13   | 30                           | 47  |

ICT is information and communications technology.

Source: Logistics Performance Index 2018.

Table 2.3

**Respondents rating the quality and competence of each service provider type “high” or “very high,” by LPI quintile**

Percent of respondents

| LPI quintile    | Road transport | Rail transport | Air transport | Maritime transport and ports | Warehousing, transloading, and distribution | Freight forwarders | Customs brokers | Trade and transport associations | Consignees or shippers |
|-----------------|----------------|----------------|---------------|------------------------------|---|--------------------|-----------------|----------------------------------|------------------------|
| Bottom quintile | 28             | 19             | 37            | 44                           | 33  | 32                 | 14              | 24                               | 22                     |
| Fourth quintile | 30             | 9              | 39            | 46                           | 21  | 38                 | 26              | 19                               | 26                     |
| Third quintile  | 36             | 24             | 58            | 40                           | 39  | 45                 | 45              | 32                               | 22                     |
| Second quintile | 38             | 26             | 49            | 53                           | 49  | 59                 | 36              | 42                               | 38                     |
| Top quintile    | 78             | 41             | 70            | 71                           | 69  | 78                 | 68              | 56                               | 52                     |

Source: Logistics Performance Index 2018.

providers there is a quality gap between the top LPI quintile and the other four quintiles.

For countries in all LPI quintiles, freight forwarders are rated highly, typically at or close to the strongest scores among service providers (see table 2.3).<sup>6</sup> Ratings for the other service provider types vary more widely across all quintiles—though rail transport service provision, like rail infrastructure, consistently receives low ratings (see table 2.3). Rail transport aside, in the top-performing countries, service providers of all types are rated as being of high quality and competence, though the scores for consignees or shippers and for trade and transport associations are lower than for most other types.

A ratings gap between services and infrastructure appears generally across World Bank regions (table 2.4). It is particularly stark for air transport in Europe and Central Asia and Latin America and the Caribbean, for road transport in Latin America and the Caribbean and Sub-Saharan Africa, and for warehousing in Sub-Saharan Africa. These data suggest a need to

develop transport-related infrastructure, so that service markets reforms can bring maximum benefits to users.

As for infrastructure performance, it is possible to compare service performance over LPI years. Figure 2.3 shows performance in the bottom quintile, where improvements are particularly important, over 2014–18. Across most types of service provider, respondent satisfaction has clearly increased. The bottom quintile is particularly important, as underdeveloped logistics services markets are often a key constraint on performance. But figure 2.3 suggests that even in challenging environments, governments and the private sector can move toward higher performance in a fairly short time. For other quintiles, results are more variable.

### **Streamlining border procedures and facilitating trade**

The survey collects a set of indicators related to the time to trade, the ease of clearance at

Table 2.4

**Difference between respondents rating services “high” or “very high” and those rating infrastructure “high” or “very high,” by World Bank developing country region**

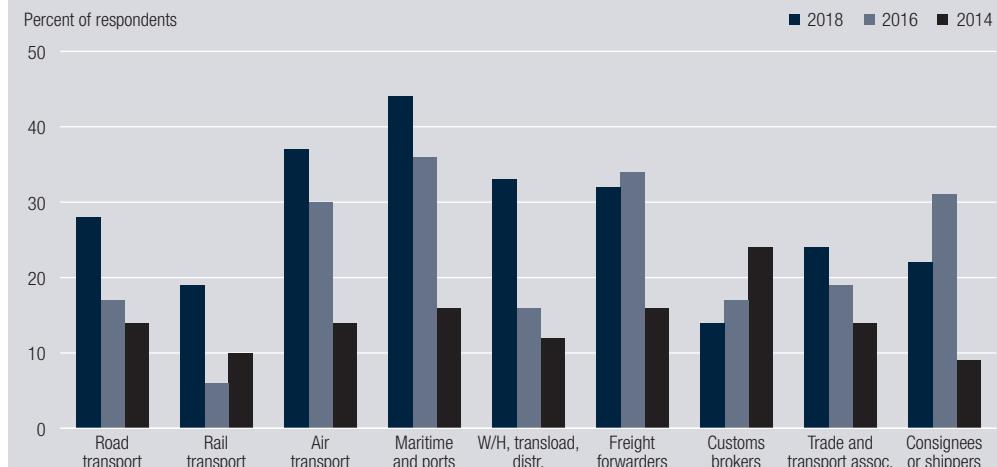
Percentage points

| Region                       | Maritime transport and ports | Air transport | Road transport | Rail transport | Warehousing, transloading, and distribution |
|------------------------------|------------------------------|---------------|----------------|----------------|---|
| East Asia and Pacific        | 9                            | 9             | 3              | 0              | 4   |
| Europe and Central Asia      | 9                            | 18            | 16             | 2              | 6   |
| Latin America and Caribbean  | 21                           | 18            | 12             | 5              | 11  |
| Middle East and North Africa | 0                            | -9            | 8              | 3              | -7  |
| South Asia                   | 6                            | 10            | 1              | -8             | 4   |
| Sub-Saharan Africa           | 5                            | 12            | 16             | 14             | 16  |

Source: Logistics Performance Index 2018.

Figure 2.3

**Respondents rating the quality of each infrastructure service type as “high” or “very high,” bottom LPI quintile, 2014–18**



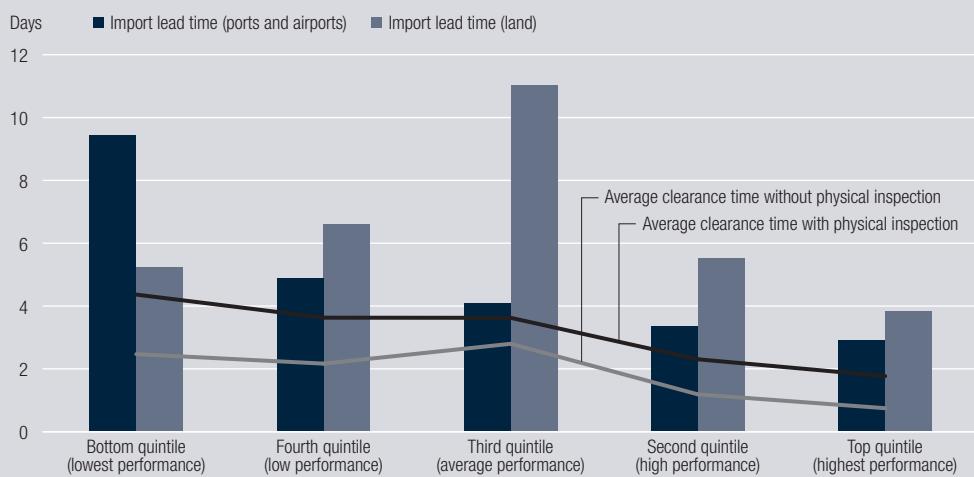
Source: Logistics Performance Index 2014, 2016, and 2018.

the border, and the experience with red tape. Breakdowns of these data by region and income group are in appendix 3, and for time and distance by country in appendix 4. These indicators provide contrasting insight into the depth of implementation of trade and transportation reforms. The principles of trade facilitation are widely accepted—for instance, automated submission is the norm in all performance groups. But lead times to import or clear goods or amounts of red tape still differentiate much between the bottom three quintiles and the two top performance tiers: for the bottom three clearance times are three times as much and paperwork twice as much as for the top two.

### Import and export time

The time to complete trade transactions is a useful outcome measure of logistics performance. The median import lead time for port and airport supply chains, as measured for the LPI, is generally lower in higher performing groups (figure 2.4).<sup>7</sup> It takes nearly three times as long to import in the bottom quintile as in the top quintile. This substantial gap is similar to the one in 2016. But unlike previous reports, this year’s does not show a consistent relationship between time and performance quintile. Instead, results for the third quintile, particularly the land supply chain, seem anomalously high. These relationships will need to be inspected closely in future years to see whether

Figure 2.4

**Median import time and average clearance time, by LPI quintile**

Source: Logistics Performance Index 2018.

Customs procedures are becoming more similar worldwide: even the bottom quintile countries tend to adopt core customs best practices

the issue is sampling error or changes in respondent demographics, or concrete issues of performance that need to be addressed.

Importing by land takes longer than importing by air or sea in all LPI quintiles except the bottom one—possibly another anomalous result. The correlation between land distance and import lead time suggests that geographic hurdles—in addition to infrastructure, service provision, and other logistics issues—are important in determining a country’s ability to connect with world markets.

Besides geography and speed en route, the efficiency of border processes affects import lead times. The time for border processes can be reduced at all stages, but especially clearing goods

on arrival (see figure 2.4). Although the time to clear goods through customs is a small fraction of total import time for all LPI quintiles, it rises sharply if goods are physically inspected, even in high-performing countries. Core customs procedures are similar across quintiles. But physical inspection is far more prevalent in low-performing countries, which may even subject the same shipment to repeated inspections by multiple agencies (table 2.5). Countries with low logistics performance need to cut red tape, physical inspections, and excessive and opaque procedural requirements.

Export supply chains typically have a much lighter procedural burden than import supply chains, so lead times are shorter for exports

Table 2.5

**Respondents indicating that listed customs procedures are available and being used, by LPI quintile**

Percent of respondents, unless otherwise indicated

| Customs procedure  | Bottom quintile | Fourth quintile | Third quintile | Second quintile | Top quintile |
|--|-----------------|-----------------|----------------|-----------------|--------------|
| Online processing of customs declaration                         | 76              | 94              | 83             | 92              | 95           |
| Requirement that a licensed customs broker be used for clearance | 100             | 81              | 57             | 86              | 67           |
| Choice of location of final clearance                            | 63              | 67              | 81             | 74              | 75           |
| Release with guarantee pending final clearance                   | 61              | 52              | 50             | 69              | 64           |
| Physical inspection of import shipments (percent of shipments)   | 33              | 29              | 20             | 17              | 9            |
| Multiple physical inspections of import shipments                | 18              | 11              | 11             | 3               | 5            |

Source: Logistics Performance Index 2018.

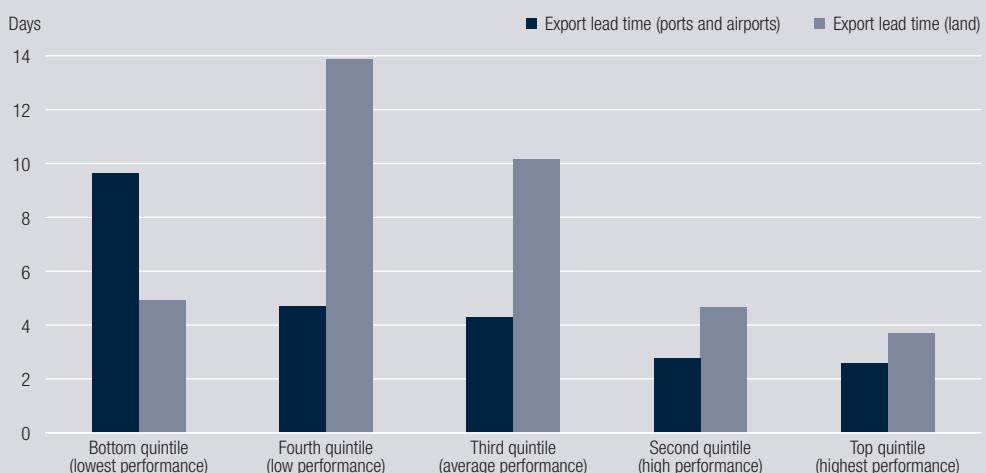
than for imports (figure 2.5). Export lead times for overall logistics performance have generally declined, but not for land supply chains in the third and fourth quintiles, an anomalous result that will need to be monitored in future reports. The familiar logistics gap between income groups appears again for export lead times, which are nearly four times as long for low- as for high-income countries (figure 2.6). That gap is far wider than in previous editions, perhaps due to a different locational composition of survey respondents. Export times for land supply chains differ much more between

low-income countries and the rest than between middle- and high-income countries. Many low-income countries have long export lead times, hurting their export competitiveness and ability to trade internationally.

Unlike lead times, customs procedures are becoming more similar worldwide (see table 2.5). Even the bottom quintile countries tend to adopt core customs best practices.

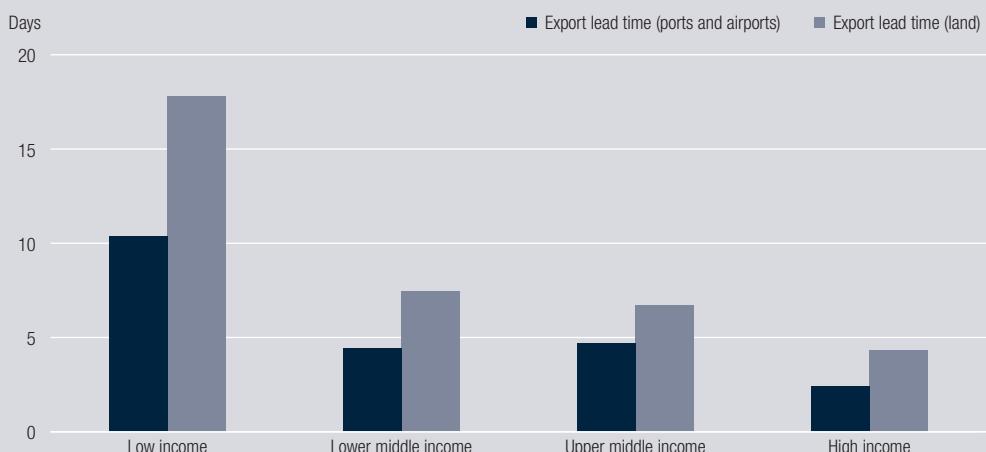
Even as customs procedures gradually improve, customs is not the only agency in border management in many countries, and the other agencies constrain supply chain performance.

**Figure 2.5 Median export lead time, by LPI quintile**



Source: Logistics Performance Index 2018.

**Figure 2.6 Median export lead time, by income group**



Source: Logistics Performance Index 2018.

Table 2.6

**Respondents rating the quality and competence of three border agencies as “high” or “very high,” by LPI quintile**

Percent of respondents

| LPI quintile    | Customs agencies | Quality/standards inspection agencies | Health/sanitary and phytosanitary agencies |
|-----------------|------------------|---------------------------------------|--|
| Bottom quintile | 15               | 26                                    | 25   |
| Fourth quintile | 15               | 23                                    | 21   |
| Third quintile  | 32               | 32                                    | 21   |
| Second quintile | 44               | 43                                    | 39   |
| Top quintile    | 76               | 58                                    | 55   |

Source: Logistics Performance Index 2018.

In 2018, the performance gap between customs and other border agencies is narrower than in previous LPI reports, and even reversed in the fourth quintile (table 2.6). Previous editions stressed that for many countries, the key to improving border agency performance may lie with reforms to agencies other than customs. There is evidence that some countries have been moving forward on this agenda, though the data will need to be monitored in future years to see whether the trend continues.

It remains important to look beyond customs when designing trade facilitation reforms. Fewer inspection procedures are required for products that are not perishable or time sensitive. Health and sanitary and phytosanitary (SPS) agencies have been slow to automate, although that may be changing. Cooperation

among all agencies—standards, transport, veterinary, and health/SPS—is critical to reform. So is introducing modern approaches to regulatory compliance.

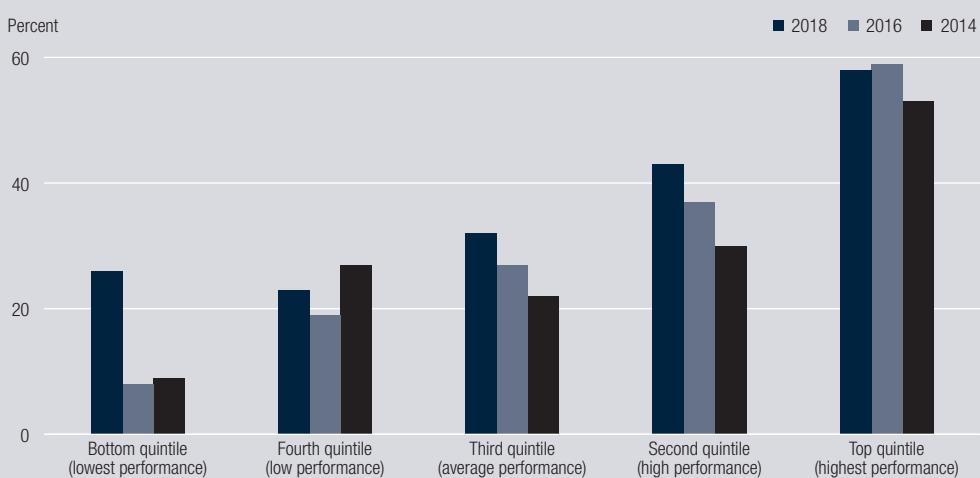
Whereas customs performance has remained constant across the board since the 2014 LPI report, quality and standards/inspection agencies have improved considerably in lower quintiles. Figures 2.7 and 2.8 show a clear trend toward greater satisfaction with them.

### Red tape

Indicators for red tape show a continuing lack of border coordination, resulting in a burden on private logistics operators similar to the one in previous editions. In countries in the bottom quintile, operators typically deal with around twice as many government agencies and

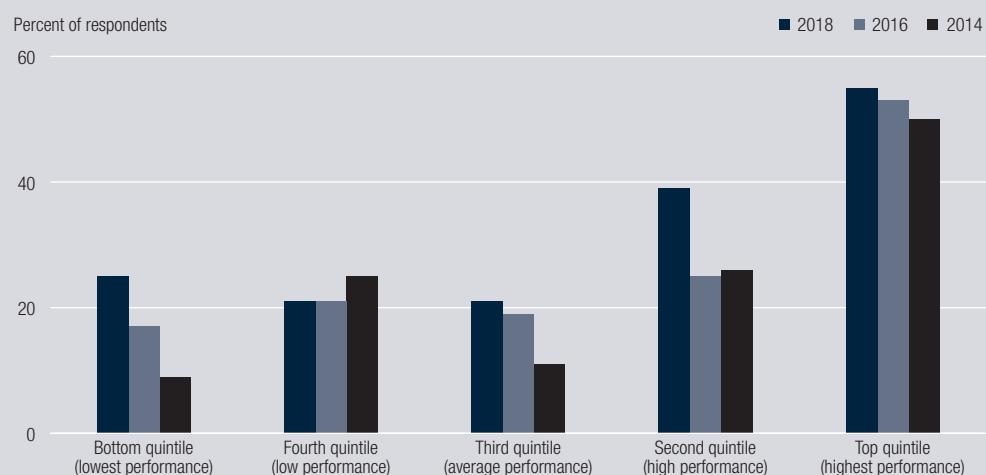
Figure 2.7

**Respondents rating the quality and competence of quality and inspection agencies as “high” or “very high,” by LPI quintile, 2014–18**



Source: Logistics Performance Index 2014, 2016, and 2018.

**Figure 2.8 | Respondents rating the quality and competence of health and sanitary/phytosanitary agencies as “high” or “very high,” by LPI quintile, 2014–18**



Source: Logistics Performance Index 2014, 2016, and 2018.

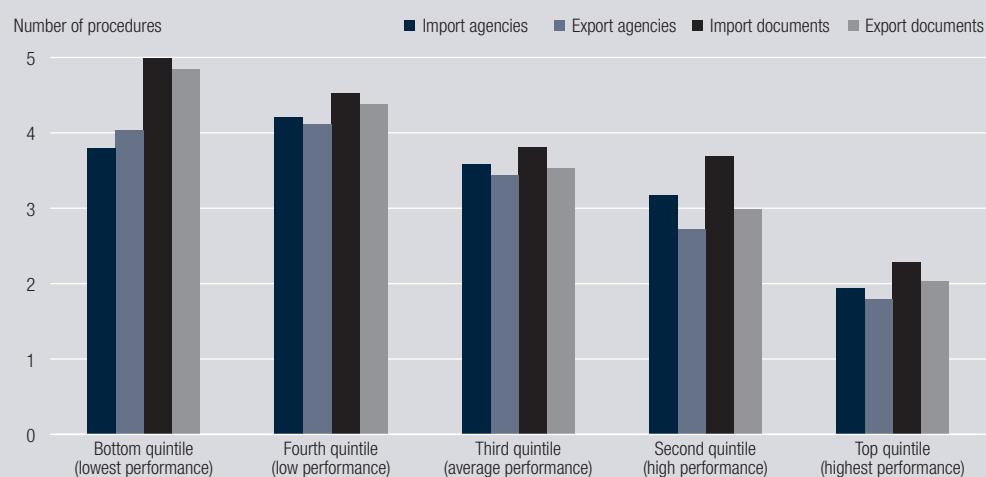
documentary requirements operators as countries in the top quintile (figure 2.9). Countries in the top quintile typically require two supporting documents for trade transactions, and those in the bottom, four to five—a persistent logistics gap in the previous and current LPIs.

Simplifying documentation for imports and exports has long been high on the trade facilitation agenda, prompting initiatives to bring border agencies together and create a single window for trade. The World Bank and International Finance Corporation’s *Doing Business* indicators

place great weight on such simplification. Still, steps in other aspects of border management and, more generally, soft and hard trade-related infrastructure are also needed.

The World Trade Organization (WTO) Agreement on Trade Facilitation (TFA) can help in two areas. First, its standards are subject to the WTO’s binding trade disciplines, unlike previous conventions, although developing countries remain free to select which parts of the TFA will become immediately binding, which will be deferred, and which

**Figure 2.9 | Red tape affecting import and export transactions, by LPI quintile**



Source: Logistics Performance Index 2014, 2016, and 2018.

will apply only once technical assistance is received. Second, to support this framework, the TFA strengthens the delivery of technical assistance and capacity-building support for developing and least developed countries. Many of the agreement's measures are relatively straightforward to implement, while others, such as introducing national single-window systems, can be quite complex and will require sustained effort from governments.

### **Supply chain reliability: A key concern for all countries**

Logistics performance is strongly associated with supply chain reliability and predictable shipment delivery. The causes of delays identified in the survey are more worrisome in the three bottom performance quintiles than in the top performers or even the second quintile.

Some causes of delays or unreliability are endogenous to a country's supply chain: the quality of service and the cost and speed of clearance processes are examples. But other causes, such as dependence on indirect maritime routes, lie outside the domestic supply chain and are not under a country's control.

The LPI details possible causes of delay not directly related to how domestic services and agencies perform (table 2.7). Again, the contrast is striking between the top and bottom LPI quintiles, especially in three areas: informal (corrupt) payments, compulsory warehousing, and preshipment inspection. The first two overlap with the problems identified in previous LPI reports. Since the 2016 report, reported delays in the bottom quintile declined considerably,

consistent with the lower prevalence of most kinds of delays in the bottom quintile than in the middle ones. It is hoped that this important change reflects catching up, and monitoring the trend in future reports will be important.

Despite clear improvements, delays and unexpected costs are more common in bottom quintile countries than the top performers, undermining overall supply chain performance. Worse, across LPI quintiles the incidence of delays is generally increasing, except in the lowest quintile in some cases. The general pattern suggests that supply chain predictability is an acute commercial problem but may be moving in the right direction in the lowest-performing countries.

Predictable, reliable supply chains are central to good logistics performance. Indeed, highly uncertain lead times can disrupt production and exporting, forcing firms to adopt costly strategies such as express shipping or sharply higher inventories, eroding competitiveness within global and regional value chains that use just-in-time production. Although firms can adopt strategies, such as building in redundancies to deal with disruptions affecting one supplier, countries that want their firms to join, and move up in, global and regional value chains must provide the conditions for predictable, reliable supply chains.

An additional reason for policy makers to focus greater attention on supply chain reliability and predictability is the emerging networked structure of global and regional trade, linked in part to the rise of value chains. In a network, small disruptions at one link can spread rapidly and sometimes unpredictably to

Predictable, reliable supply chains are central to good logistics performance; highly uncertain lead times can disrupt production and exporting

**Table 2.7 Respondents reporting that shipments are “often” or “nearly always” delayed, by delay category and LPI quintile**

Percent of respondents

| LPI quintile    | Compulsory warehousing | Preshipment inspection | Maritime transshipment | Theft | Informal payments |
|-----------------|------------------------|------------------------|------------------------|-------|-------------------|
| Bottom quintile | 26                     | 20                     | 11                     | 8     | 13                |
| Fourth quintile | 27                     | 21                     | 13                     | 5     | 30                |
| Third quintile  | 23                     | 27                     | 14                     | 14    | 22                |
| Second quintile | 14                     | 13                     | 18                     | 5     | 13                |
| Top quintile    | 5                      | 5                      | 6                      | 2     | 3                 |

Source: Logistics Performance Index 2018.

In the top quintile, most respondents report that import and export shipments “always” or “nearly always” arrive on schedule, but in the bottom quintile, only around half as many do

other links. The efficiency gains associated with networked production models thus come with increased systemic risk, because the structure itself can be vulnerable to small shocks affecting crucial links. Countries that cannot provide the conditions for developing predictable and reliable supply chains will become increasingly disconnected from world markets, where networked production models are common. Low-performing countries need greater policy attention to improve their connectivity and to stem any further marginalization in the global trading system.

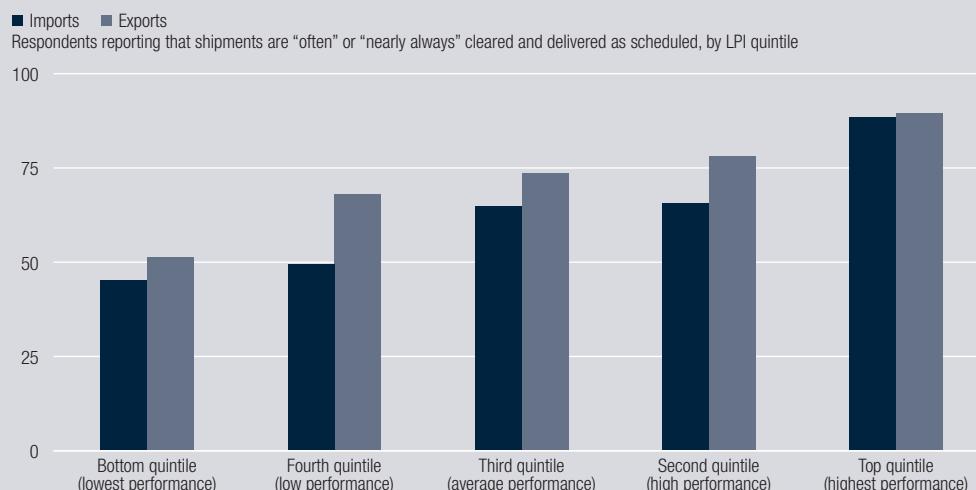
Supply chain reliability and predictability are further reflected in a key performance metric from the domestic LPI, timeliness of clearance and delivery (figure 2.10). Given that the frequency of delays tends to rise with declining logistics performance, it is unsurprising that the timeliness of clearance and delivery generally suffers as one moves down the LPI quintiles. In the top quintile, most respondents report that import and export shipments “always” or “nearly always” arrive on schedule, but in the bottom quintile, only around half as many do. However, compared with the 2016 LPI report, performance in the low and middle quintiles is noticeably improved, so some convergence is taking place. This finding again highlights the

importance of low-performing countries taking steps to improve predictability and reliability of supply chains, to continue narrowing this part of the logistics gap.

The fourth LPI quintile has the largest difference between on-schedule arrival rates for exports and those for imports (see figure 2.10), as in the previous LPI report. The bottom quintile has a substantially narrower gap. A lower rate of favorable survey responses for imports suggests that supply chain unreliability discriminates in practice (if not in law) against foreign goods. As traditional trade barriers continue to fall around the world, policies contributing to such other barriers become ever larger determinants of performance and trade outcomes. So, addressing the causes of unexpected delays—including unpredictability in clearance, inland transit delays, and low service reliability—should be an important part of logistics reform in low-performing countries.

The patterns for supply chain reliability are more striking in some World Bank regions than others (figure 2.11). The geographic predictability gap may influence competitiveness and the spread of regional supply chains and production networks. However, caution is appropriate in approaching figure 2.11 because the data vary considerably from one year to another, in part

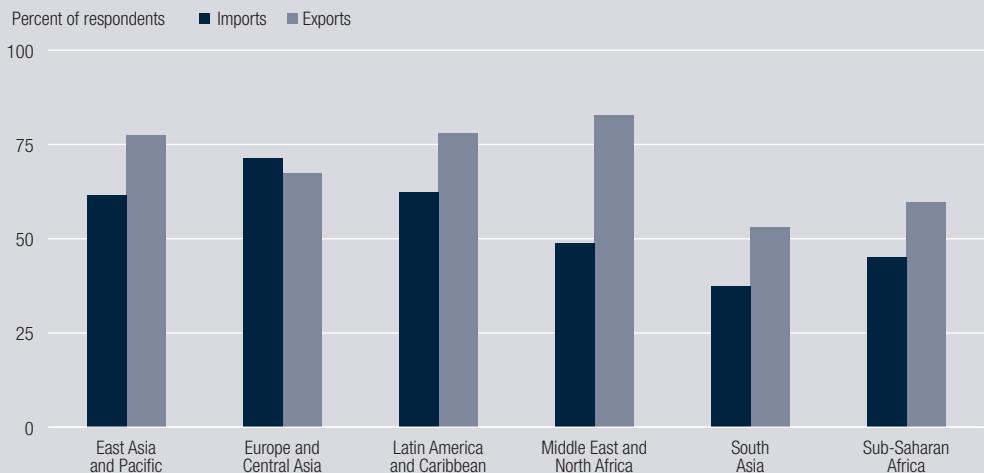
**Figure 2.10** Respondents reporting that shipments are “often” or “nearly always” cleared and delivered as scheduled, by LPI quintile



Source: Logistics Performance Index 2018.

Figure 2.11

**Respondents reporting that shipments are “often” or “nearly always” cleared and delivered as scheduled, by World Bank developing country region**



Source: Logistics Performance Index 2018.

due to differences in response patterns across countries.

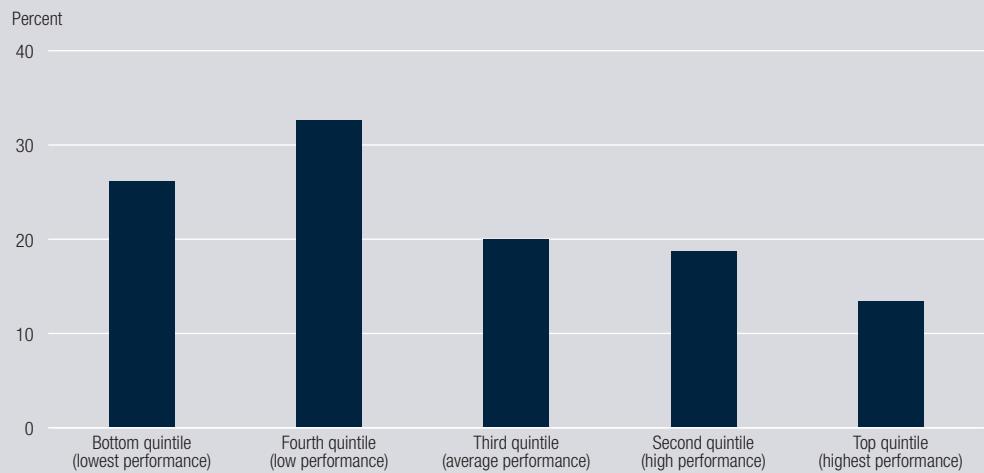
Supply chain quality is not just a matter of time and cost. A further consideration—for private sector operators and their clients—is shipment predictability, which varied widely in the 2018 LPI, as in previous reports (figure 2.12). In the top LPI quintile, just 13 percent of shipments fail to meet company quality criteria—the same proportion as previously. Twice as many shipments in the bottom quintile fail to

meet company quality criteria. However, performance in the bottom quintile has improved noticeably since the 2016 LPI, while the result for the fourth quintile appears anomalous—it has the highest percentage failing to meet company quality criteria. This finding again illustrates that the logistics gap is real but perhaps narrowing from an overall perspective of supply chain efficiency and reliability.

The most important quality criterion in freight forwarding is delivery within the

Figure 2.12

**Shipments not meeting company quality criteria, by LPI quintile**



Source: Logistics Performance Index 2018.

promised time window. Almost as important is the absence of errors in cargo composition or documentation. The window of acceptable quality is much narrower, and errors are much less

tolerated, in high-performing countries than in low-performing countries. The shipment quality gap only partly reflects these differing expectations.

SECTION  
**3**

# Logistics trends, reform implementation, and the Logistics Performance Index

The global logistics landscape displays positive trends, even though disparities remain between the top performers and many developing countries. In developing countries, the logistics agenda appears even more prominent today than it was in 2007, as interventions expand with changes in demand, changes in industry, and the increasingly central role of sustainability-related concerns. Often motivated by the Logistics Performance Index, national governments and regional groups are promoting reform. And international organizations—the Organisation for Economic Co-operation and Development (OECD), the United Nations Conference on Trade and Development, the World Bank, and regional development banks—are supporting them.

## The LPI: Stimulating and informing reforms

Since their inception, the LPI and its conceptual framework have motivated comprehensive reforms, as in India and Oman (for Oman, see box 3.3 below). Since 2016, India has emphasized logistics among its high-priority economic reforms to meet challenges of large country size, congested hubs, and internal barriers to trading good and services. To complement the groundbreaking unification of the sales tax across states, the government of India appointed a Special Secretary for logistics, in charge of cross-cutting policies and coordination. And in 2018, the government commissioned a subnational LPI, applying the World Bank LPI concept.<sup>8</sup>

The LPI and related datasets produced at the World Bank<sup>9</sup> are widely used as inputs for analytical policy work and in academic research in areas such as transportation, operations research, and trade (box 3.1).

## Shifting priorities

Global logistics has changed in big ways since the first LPI report. The 2008–09 trade crunch that ended an era of fast growing international trade put pressure on traditional actors. And new players and new business models, such as e-commerce, have emerged. Technology and new concerns about supply chain resilience drive industry changes and reshape the policy agenda.

## Megatrends and policies

A recent publication by the World Economic Forum, prepared by leading experts, identified eight megatrends likely to drive the future of logistics:

1. Logistics skill shortages.
2. Restructuring global value chains.
3. Supply risk and recovery (resilience).
4. Digital transformation of supply chains.
5. Sustainability of supply chains.
6. E-commerce driving demand chains.
7. Logistics property and infrastructure.
8. Collaborative business models.<sup>10</sup>

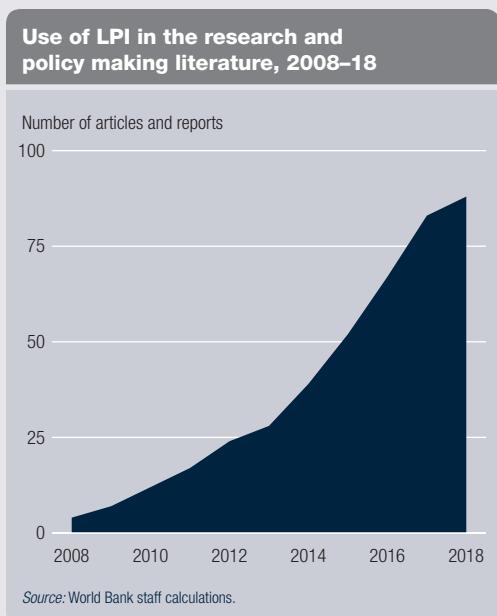
Most of these trends are directly relevant for the logistics policy agenda. So, the 2018 LPI survey asked about the drivers of change for freight forwarding services. Most respondents across country income groups see the demand for services growing, fueled by the expansion of e-commerce (figure 3.1).

## The importance of skill development for logistics

Despite extensive mechanization and automation, logistics remains a people business. Logistics at an operational level is labor-intensive, with many blue-collar workers (such as truck drivers and warehouse operators) and

### Use of the LPI in research and policy-making literature

Since its launch in 2007, the LPI has established itself as an important source of global trade and transport facilitation and logistics performance indicators for policy makers, academics, logistics practitioners, and traders. It is also used by advocacy groups. Almost 90 research or policy-making publications since 2008 have used LPI data (see figure), in addition to several textbooks and many materials and theses.



The LPI is also a component in various trade and transport indicators, such as the World Economic Forum Enabling Trade Index, first published in 2008, and the European Union Transport Scoreboard, launched in 2014.<sup>a</sup> Almost all multilateral agencies—such as

the Asian Development Bank, the African Development Bank, the Inter-American Development Bank, the United Nations Economic Commission for Europe, the United Nations Commission on Trade and Development, and the United Nations Economic and Social Commission for Asia and the Pacific—include the LPI as a regular element in their trade and transport publications. In addition, large and small consultancies and several logistics firms, regularly include LPI data in their reports.

Thematically, the use of LPI can broadly be arranged into two main categories: trade and transport facilitation and supply chain management, transport, and logistics competitiveness (see table). In more than 40 publications, LPI data are the main empirical evidence, and an almost equal number use the data as a reference. Most of the publications are academic papers that may address both categories. A non-exhaustive list of the references is in appendix 7.

#### Thematic division of use of LPI in the research and policy making literature

|                      | Trade economics,<br>trade and transport<br>facilitation and similar | SCM/logistics/transport and<br>competitiveness issues on<br>national or industry levels | Total |
|----------------------|---|---|-------|
| Main empirical data  | 27  | 14  | 41    |
| Major reference data | 21  | 13  | 34    |
| Minor reference      | 2   | 11  | 13    |
| Total                | 50  | 38  | 88    |

a. The World Economic Forum's Enabling Trade Index has used the LPI three times, and the European Union Transport Scoreboard twice.

administrative clerks. The quality, training, and retention of these employees is a major factor in logistics performance. Lower-quality service hurts production and international trade. Yet human resources, often overlooked or taken for granted, depend not only on the policies of companies but also on national initiatives to educate and train people for logistics occupations.

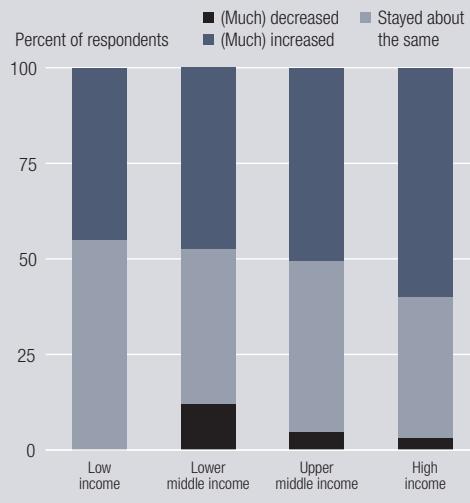
In 2017, the World Bank and the Kühne Logistics University published a report on skills, competencies, and training in the logistics sector.<sup>11</sup> It highlighted a general perception that qualified logistics-related labor is in short supply at all levels in both developed and developing countries, suggesting that the problem is likely to remain or worsen over the next five

years. Respondents in developing countries see the most severe skill shortage at the managerial level—for example, in filling senior supply chain management positions. In developed countries, the most severe shortage is for a qualified blue-collar workforce, such as truck drivers.

Reasons for the shortages include the low prestige and status of operational logistics workers. The sector offers comparatively low salaries, leading to an inferior position in the war for talent. Many developing countries, even if they suffer from high unemployment, have a limited supply of skilled labor. Logistics developments, particularly in information technology, demand new competencies that the workforce does not possess. Developing countries

Figure 3.1

**Increased use of electronic trading platforms (business to business and business to consumer) by shippers mean that our business volumes have...**



Source: Logistics Performance Index 2018.

lag behind developed ones in training budgets, course content, and the quality of the educational experience and training provider. Vocational schools for logistics jobs are lacking. And training—if there is any—is limited to short-term, on-the-job instruction by colleagues during daily operations. This failure disproportionately affects the young, an untapped reservoir of apprentices.

National governments and international agencies have traditionally paid more attention to infrastructure and trade facilitation than to fostering quality services and a skilled workforce. Employees are hired by private companies, and their training is largely a private responsibility. But governments play an important role directly by regulating or providing training—and indirectly by facilitating private initiatives. Developing countries need a major expansion of logistics training and skill development initiatives. Public interventions promoting logistics competence include the following:

- Education and training by public institutions, or financial support to training.
- Education policy and curricula development.
- Advocacy, public–private dialogue, and multi-stakeholder collaboration.

- Regulation of freight and logistics services, including customs brokerage and trucking.
- Setting and harmonizing competency standards for different jobs.
- Raising skill levels in state-owned logistics enterprises (typically ports and railways).
- Investing in human capital as a component of the development of logistics and freight infrastructure.

As part of its country work, the World Bank recently began to offer a comprehensive assessment of skills and competencies at the national level to support logistics improvements (box 3.2). It pinpoints labor skills and constraints in logistics jobs and suggests priorities for intervention to upgrade skills.

In the current era of globalization, extended supply chains have created more interdependence, and commerce and production have been disrupted by natural events and man-made disasters

### Supply chain resilience

Commerce and production have been disrupted by natural events and man-made disasters, such as civil wars or, recently, cyber-disasters. In the current era of globalization, extended supply chains have created more interdependence. Local events create disturbances much beyond the area directly affected when supply chains are interrupted with no backup. In 2010, the eruptions of the Eyjafjallajökull volcano in Iceland grounded most European air transportation for weeks and broke the air cargo export supply chains of many African developing countries for several weeks. In 2011, the tsunami in Japan and the floods in Thailand disrupted trade by striking key nodes of global value chains. In such severe events, supply chain links can take a long time to rebuild and may even be permanently altered.

The resilience of international and domestic supply chains is thus emerging as a policy concern, requiring measures by government agencies and private companies, as in Canada, Japan, the Nordic countries, and the United States.

In mid-2017, cyberattacks on global providers created significant physical supply chain disruption for weeks, so the 2018 LPI survey included a question on the importance of resilience in cybersecurity. The perceived magnitude of cyberthreat and preparedness

to respond go hand in hand, and developing countries lag behind (figures 3.2 and 3.3).

### Environmental sustainability of logistics

This edition of Connecting to Compete, like the three previous editions, included a question on the demand for environmentally friendly international logistics. The results are consistent: Environmentally friendly supply chains are associated with higher logistics performance

(figure 3.4). This trend is good news, as logistics has a fairly large footprint not only on the economy but also on the environment.

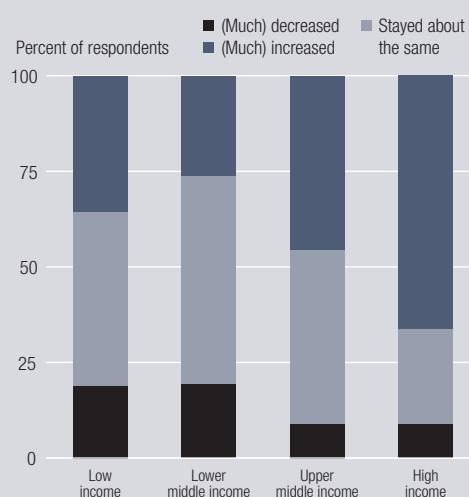
### Asking for green logistics?

Emissions from all logistics activities are hard to measure, but transport offers a good proxy: 23 percent of all energy-related emissions can be attributed to transport,<sup>12</sup> and about 7 percent of global CO<sub>2</sub> emissions can be attributed to freight transport,<sup>13</sup> which is estimated to have emitted 3.2 gigatons of CO<sub>2</sub> in 2015.<sup>14</sup> This number is estimated to rise in the next decades, with a higher growth in emerging economies than in Europe.

In top-quintile countries, 28 percent of respondents indicated in 2018 that shippers often or nearly always ask for environmentally friendly shipping options—in emission levels and choices of routes, vehicles, and schedules (down from 34 percent in 2016). The share drops to 14 percent in second-quintile countries, and then steadily declines in the third (9 percent), fourth (7 percent) and fifth (5 percent) quintiles (see figure 3.4).

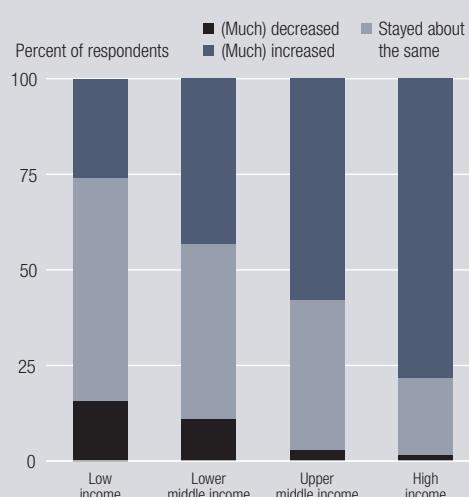
The picture is slightly more balanced for respondents answering that shippers “sometimes” ask for environmentally sustainable shipping options, ranging from 27 percent in the top quintile and 21 percent in the bottom one.

**Figure 3.2 | Cybersecurity threats in logistics have...**



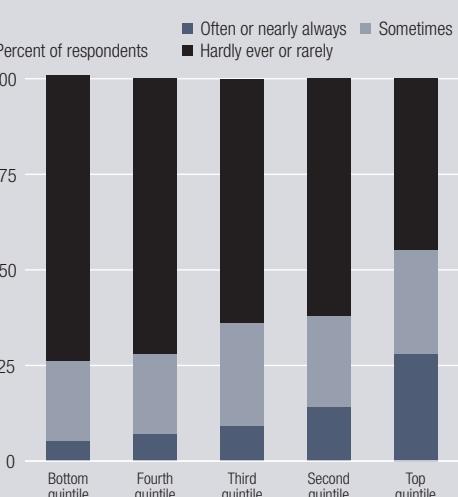
Source: Logistics Performance Index 2018.

**Figure 3.3 | Our firm's preparedness for cyberthreats has...**



Source: Logistics Performance Index 2018.

**Figure 3.4 | The demand for green logistics**



Source: Logistics Performance Index 2018.

In 2017, to support logistics service improvements, the World Bank introduced the “Logistics skills, competencies, and training toolkit,” which was co-developed with the Kühne Logistics University. The toolkit systematically evaluates logistics skill requirements, assesses whether they are being met by current training and education, and suggests priority areas for intervention to upgrade logistics skills.

The toolkit assesses 20 areas, tailoring the assessment to interviewees not knowledgeable about every area (see table).

The toolkit mainly relies on qualitative data obtained from interviews with logistics stakeholders, such as shippers, recruitment agencies, educational institutions, professional associations, logistics service providers, and government ministries dealing with transport and professional training. Following the

interviews, each assessment area is assigned a maturity level on a scale from 1 to 5 (from minimal capacity to global best practice). An assessment report is then prepared, with recommendations for policy responses.

To test the toolkit, a pilot study was performed in 2017 in Togo, a small, Sub-Saharan economy located between Benin and Ghana. It has a population of around 7.8 million, nearly 60 percent younger than 25. Because Togo exports phosphates, cocoa, coffee, and cotton, logistics is a key to economic prosperity. The toolkit enabled a useful scan of the skills and competencies in logistics, and provided valuable policy insights on how to address educational and training needs.

**Source:** World Bank 2017b.

#### **Areas assessed by the logistics skills, competencies, and training toolkit**

|        |   |   |   |  |
|--------|---|---|---|--|
| Demand | Recruitment of operative logistics staff            | Skill level of existing operative logistics employees   | Recruitment of administrative logistics staff                     | Skill level of existing administrative employees             |
|        | Recruitment of logistics supervisors                | Skill level of existing logistics supervisory employees | Recruitment of logistics managers                                 | Skill level of logistics managers currently in post          |
| Supply | Availability of vocational education in logistics   | Quality of vocational education in logistics            | Availability of logistics education by private training providers | Quality of logistics education by private training providers |
|        | Availability of logistics education by universities | Quality of logistics education by universities          | Availability of in-house training                                 | Quality of in-house training                                 |
|        | Certification of logistics skills                   | Role of associations                                    | Attractiveness of logistics industry                              | Availability of recruitment services                         |

Higher costs and fewer choices for shipping are likely the chief culprits for the discrepancy between higher and lower performing countries, as are fears of adding transit time in an already long and unpredictable supply chain.

#### **Reducing the logistics footprint**

Decarbonization measures can curb the detrimental effect of freight transport. They include improved asset utilization in logistics (such as for storage and handling), higher energy efficiency of road and rail freight, low-carbon energy for ships (such as biofuels), fuel efficiency in air cargo, and modal shifts (a moving higher proportion of freight to modes with lower carbon intensity).<sup>15</sup>

Climate change mitigation also features in the United Nations Sustainable Development Goals (SDGs) adopted in September 2015. While transport and logistics are not explicitly

named, they influence several of the 17 SDGs: 7, affordable and clean energy; 9, industry, innovation, and infrastructure; 11, sustainable cities and communities; 12, responsible consumption and production; and 13, climate action.

Several organizations focused on specific modes of transport (road, rail, air, and maritime, including seaports) reference the SDGs. They include the International Civil Aviation Organization in its 2030 Agenda for Sustainable Development through promoting sustainable air transport.<sup>16</sup> For maritime shipping, the International Maritime Organization formulates maritime policies and in April 2018 adopted an initial strategy to halve emissions from maritime transport by 2050 from the 2008 level.<sup>17</sup>

In addition, the worldwide port industry launched its SDG initiative called the World

While the development of connecting infrastructure remains a central concern, middle-income countries have to deal with an increasingly complex set of policies

Ports Sustainability Program in March 2018.<sup>18</sup> The road transport industry is recognizing the SDG, too: its primary organization, the International Road Transport Union, is promoting the agenda among its members and in cooperation with relevant bodies, such as the United Nations Economic Commission for Europe.<sup>19</sup>

Other international bodies that have green logistics and transport on their agenda include the International Energy Agency (IEA) and the International Transport Forum (ITF), both linked to the OECD.<sup>20</sup> The IEA's guidance for countries to reduce dependence on oil and greenhouse gas emissions runs under the theme, "Avoid, Shift, Improve." Its recent transport policy reports include "The Future of Trucks," which highlights how improved efficiency and alternative truck fuels can help meet environmental objectives,<sup>21</sup> and the "Global EV Outlook 2017," which features recent developments of electric vehicles as well as market and policy implications.<sup>22</sup>

The ITF launched its "Decarbonizing Transport" initiative in 2016, with the goal of achieving zero transport emissions around 2050. At the heart of the project are tools to enable decisionmakers to select the most fitting CO<sub>2</sub> reduction measures. The initiative focuses on assessing the impacts of CO<sub>2</sub> reducing measures, not on advocating specific measures.

Country-level examples include the Nordic countries—Denmark, Finland, Iceland, Norway, and Sweden—which have embraced the goal of being fossil free by 2050.<sup>23</sup> While 87 percent of electricity generated across the Nordic countries is already carbon-free, several challenges remain: the variability of wind energy in Denmark, the reliance on biomass and forestry products in Finland, and the investments in oil and hydropower in Norway.

The logistics footprint is also spatial, requiring large land areas for facilities such as warehouses, and transport connections to and from them. Logistics not only competes for space with industry and commerce, but also generates traffic in high-density areas. With growing urbanization in developing countries, rapidly increasing urban freight transport has a big impact economically (inefficiencies and urban

competitiveness), environmentally (air pollution and noise), and socially (quality of life and health). Hence, the sharper focus on urban logistics and the spatial planning of logistics facilities, as in logistics centers and zones.

## Managing the complexity of implementation

The initial focus of logistics related reform emphasized building connecting infrastructure and facilitating trade at the border. That traditional agenda remains important for developing countries, especially for low logistics performers (see section 2), and is still at the core of interventions of international organizations. Connecting infrastructure in developing countries is a high priority of development partners. It is also targeted by the major connectivity initiatives such as the Belt and Road. Trade facilitation good practices have been spelled out in documents and conventions by specialized international organizations such as the United Nations Economic Commission for Europe and the World Customs Organization since the 1970s. Regulatory reforms of the logistics services sectors are also key to logistics performance, as advocated in previous editions of *Connecting to Compete*. Regulatory improvements aim to enhance the quality of service delivery, building on market mechanisms and private sector participation. These reforms are nevertheless challenging to implement in many developing countries. They deal with sectors such as trucking, brokerage, and terminal or warehousing operations, which in many places operate with limited efficiency and with barriers to modernization or entry of new services.

The emerging policy areas, such as resilience and urban logistics, are at least as relevant to developing countries as to developed countries. The network nature of logistics means that standards and business models applicable in high-performing countries will soon appear in lower-performing countries.

## Managing logistics as a sector of the economy

Countries aiming at improving their logistics performance must see logistics as a cross-cutting

policy concern. The work crosses administrative boundaries of transportation, commerce, infrastructure, industry, finance, and the environment. And it requires mechanisms to involve the private sector (box 3.3).

The complexity of the agenda is likely to challenge countries in the second and third LPI performance tiers most. Their policy-making has to reconcile the need for consistency and depth of reforms with a set of priorities wider than those facing top performers, which are farther along, or countries in the two bottom tiers, which can focus on fewer issues.

National logistics bodies exist in several countries. They help address the cross-cutting nature of logistics, set common strategies, insure consistency across sectors, and address gaps not crossed by other agencies. China has a large government-related Federation of Logistics and Purchasing. Association of Southeast Asian Nations countries have consultative bodies to

develop and refine national strategies. Morocco set up a dedicated agency in 2013 to promote the logistics sector. Dinalog in the Netherlands —a partnership of the private sector, academia, and government agencies with shared funding—develops strategy, promotes innovation, consolidates knowledge and data, and facilitates investments.<sup>24</sup>

Another question is the legal and regulatory status of logistics as a sector of the economy. Logistics encompasses specific activities, creates new concerns because of its footprint, and brings new types of services. Very specific logistics regulations apply to services, to movements of goods, and to facilities and assets. But traditional transport, commerce, urban, and fiscal provisions rarely consider logistics as an activity or service. Many countries with an emerging modern logistics sectors are promoting a framework law to clarify the status of logistics and to improve consistency with other regulatory

### Box 3.3

#### Logistics policy making in Oman

In response to declining hydrocarbon revenues and a rising need to diversify away from oil, Oman is improving its logistics performance. In the first *Connecting to Compete* in 2007, it ranked 48th, and in 2018, 43rd.

Given that Oman was an international logistics hub in the 16th century, and wanting to capitalize on Oman's geographical position, the Omani government started work on a National Logistics Strategy in December 2013. The government was particularly interested in how to profit from Oman's political environment and its previous investments in infrastructure.

Oman's National Logistics Strategy 2040 (SOLS 2040) was developed in consultation with 65 specialists from the private sector, government, and academia. It was approved in February 2015 and confirmed as a part of a five-year plan (2016–20) in the National Program for Enhancing Economic Diversification (Tanfeedh). Oman's strategy targets the five sectors with the most growth potential: manufacturing, tourism, mining, fisheries, and transport and logistics. It aims to boost investment, create job opportunities, and increase their contribution to GDP.

SOLS 2040 identifies the need for integrated development of transport and distribution and of supporting soft infrastructure. The approach requires integrating transport modes and infrastructure, depots, terminals, ports, customs and legal procedures, finance and insurance, information technology, security, and such intermediaries as freight forwarders. The implementation of SOLS 2040 was entrusted to the Oman Logistics Center, a focal agency for simplifying, harmonizing, and automating government logistics processes

along four pillars: markets, trade facilitation, human capital, and technology applications.

Continuous interaction between the public and private sectors rapidly built trust among stakeholders. The logistics sector has grown faster (10 percent from 2016 to 2017) than the overall economy (8 percent), and the awareness of logistics has increased.

The next step under the National Logistics Strategy is to establish Oman as an international logistics hub. Oman is not aiming to directly challenge the United Arab Emirates, especially in air freight, but to act as a complementary second hub. Oman's Liner Shipping Connectivity Index has improved in recent years (63.6 in 2017), slightly ahead of Saudi Arabia (59.5), but still behind the United Arab Emirates (73.7). Significant shares of Omani imports and exports are routed through the UAE ports of Jebel Ali and Sharjah. The Omani government plans to further develop a 2,244 km rail network to link Oman to the GCC rail network and to connect Oman's major ports, industrial areas, and free zones at Sohar, Salalah, and Duqm. Oman hopes to reduce shipping times to the Upper Gulf by 2–10 days by offering significantly lower costs.<sup>a</sup>

Source: Al-Futaisi and Salem 2015; UNCTAD 2017; <http://www.tanfeedh.gov.om/en/news-National-programme-Tanfeedh-to-enhance.php>; [https://www.isc.hbs.edu/resources/courses/moc-course-at-harvard/Documents/pdf/student-projects/UAE\\_TransportLogisticsCluster\\_2007.pdf](https://www.isc.hbs.edu/resources/courses/moc-course-at-harvard/Documents/pdf/student-projects/UAE_TransportLogisticsCluster_2007.pdf).

a. Based on a benchmark voyage direct from Singapore to Suez with no Middle East call. Ports Benchmarking Study 2014, Mercator International LLC.

Table 3.1 | Interaction of LPI performance quintile and logistics priorities

••• Very important •• Important • Less important

|                                  | Lowest performer | Fourth | Third | Second | Best performer |
|----------------------------------|------------------|--------|-------|--------|----------------|
| Transportation infrastructure    | •••              | •••    | ••    | ••     | ••             |
| Trade and transport facilitation | •••              | •••    | ••    | •      | •              |
| Service markets and regulations  | ••               | •••    | •••   | •      | •              |
| Skills                           | ••               | •••    | •••   | •••    | •              |
| Green logistics                  | •                | •      | ••    | ••     | •••            |
| Urban logistics                  | •                | ••     | •••   | •••    | •••            |
| Spatial planning                 | •                | •      | ••    | ••     | ••             |
| Resilience                       | ••               | ••     | ••    | ••     | ••             |
| Dedicated logistics body         | •                | •      | •••   | •••    | ••             |
| Specific legal framework         | •                | •      | ••    | ••     | •              |
| National data system             | ••               | ••     | •••   | •••    | •••            |

areas. Greece and Morocco have done so recently. Despite limited experience, a framework legal instrument should be carefully evaluated.

#### Informing reforms with data

Data are essential for motivating, designing, and monitoring policy changes. Logistics observatories, implemented in Asia, Europe, and Latin America, typically rely on national surveys and the maintenance of a few key performance indicators based on existing data.<sup>25</sup>

One of the biggest changes since the 2007 *Connecting to Compete* is a quantum shift of country-specific logistics data from scarce to abundant. The automation of supply chain processing and the spread of tracking and tracing almost globally provide micro-level data on logistics that can be used to evaluate not only international gateways and corridors but also supply chain connectivity within countries.

Transforming the massive raw data on individual movements into relevant decision-oriented dashboards is a major technical and organizational challenge, with limited experience so far and few established methodologies or guidelines. Exceptions include South Africa and Canada, which have performance-monitoring systems for their internal logistics networks based on micro-logistics data.<sup>26</sup> And Finland's large-scale biennial national logistics surveys are in the public domain.<sup>27</sup>

\* \* \*

More advanced economies deal with a broader array of policies addressing the performance and externalities of domestic supply chains than lower logistics performers. Table 3.1 summarizes how logistics priorities connect with logistics performance.

# Notes

- 1** Boston Consulting Group 2016.
- 2** This section uses single-year results for 2018 rather than the aggregated 2012–18 LPI.
- 3** The ranking of countries by LPI score uses the weighted aggregate value of the scores from the four most recent LPI surveys, with greatest weight given to 2018. This reduces the noise and random variation across different editions of LPI surveys to provide a more balanced picture.
- 4** Boston Consulting Group 2016.
- 5** In 2018, the number of respondents from low-income countries was smaller than in 2016 (but close to the number in 2014). This may have generated more "noise" in the 2018 data, so the findings should be treated with caution.
- 6** The respondents in the LPI survey are freight forwarders and express carriers, so the quality and competence of these service providers are assessed by their peers.
- 7** Lead time to import is the median time for shipments from port of discharge to arrival at the consignee.
- 8** See <https://economictimes.indiatimes.com/news/economy/policy/government-ropes-in-deloitte-to-rank-states-on-logistics/articleshow/59552798.cms>.
- 9** The World Bank–UNESCAP International Trade Costs database is available at <http://databank.worldbank.org/data/reports.aspx?source=escap-world-bank-international-trade-costs>.
- 10** WEF 2017.
- 11** McKinnon and others 2017.
- 12** ITF 2016b.
- 13** ITF 2016a.
- 14** McKinnon 2018, p. 9.
- 15** McKinnon 2018, p. 15
- 16** ICAO n.d.
- 17** IMO 2018.
- 18** World Ports Sustainability Program, available at: <https://www.wpspevent.org/home>
- 19** IRU 2017.
- 20** Not all OECD members are members of the IEA or the ITF. Both organizations can have members that are not members of the OECD.
- 21** IEA 2017a.
- 22** IEA 2017b.
- 23** European Commission DG (Directorate-General) Environment News Alert Service 2017.
- 24** See <http://www.dinalog.org>.
- 25** ITF 2016.
- 26** Arvis and others 2016.
- 27** In English at <https://blogit.utu.fi/logistiikkaselvitys/en/225-2/>.

# Aggregated international LPI results across four editions: 2012, 2014, 2016, and 2018

| Economy              | Mean LPI rank | Mean LPI score | % of highest performer | Customs |       | Infrastructure |       | International shipments |       | Logistics quality and competence |       | Tracking and tracing |       | Timeliness |       | Missing values |
|----------------------|---------------|----------------|------------------------|---------|-------|----------------|-------|-------------------------|-------|----------------------------------|-------|----------------------|-------|------------|-------|----------------|
|                      | Rank          | Score          | Rank                   | Rank    | Score | Rank           | Score | Rank                    | Score | Rank                             | Score | Rank                 | Score | Rank       | Score |                |
| Germany              | 1             | 4.19           | 100.0                  | 1       | 4.09  | 1              | 4.38  | 4                       | 3.83  | 1                                | 4.26  | 1                    | 4.22  | 1          | 4.40  |                |
| Netherlands          | 2             | 4.07           | 97.2                   | 3       | 3.97  | 2              | 4.23  | 6                       | 3.76  | 2                                | 4.12  | 7                    | 4.08  | 6          | 4.30  |                |
| Sweden               | 3             | 4.07           | 97.2                   | 4       | 3.95  | 3              | 4.22  | 2                       | 3.88  | 5                                | 4.04  | 11                   | 4.02  | 4          | 4.32  |                |
| Belgium              | 4             | 4.05           | 96.9                   | 13      | 3.74  | 10             | 4.03  | 1                       | 3.97  | 3                                | 4.10  | 4                    | 4.11  | 2          | 4.40  |                |
| Singapore            | 5             | 4.05           | 96.6                   | 2       | 4.00  | 5              | 4.14  | 8                       | 3.72  | 4                                | 4.08  | 8                    | 4.05  | 3          | 4.34  |                |
| United Kingdom       | 6             | 4.01           | 95.7                   | 8       | 3.85  | 7              | 4.09  | 10                      | 3.69  | 7                                | 4.04  | 5                    | 4.10  | 5          | 4.32  |                |
| Japan                | 7             | 3.99           | 95.3                   | 5       | 3.91  | 4              | 4.19  | 14                      | 3.61  | 8                                | 4.03  | 9                    | 4.03  | 9          | 4.24  |                |
| Austria              | 8             | 3.99           | 95.2                   | 14      | 3.71  | 8              | 4.07  | 5                       | 3.78  | 6                                | 4.04  | 2                    | 4.13  | 11         | 4.22  |                |
| Hong Kong SAR, China | 9             | 3.96           | 94.6                   | 9       | 3.85  | 11             | 4.02  | 3                       | 3.85  | 10                               | 3.94  | 13                   | 3.95  | 13         | 4.18  |                |
| United States        | 10            | 3.92           | 93.7                   | 11      | 3.76  | 6              | 4.10  | 23                      | 3.54  | 11                               | 3.93  | 3                    | 4.13  | 16         | 4.14  |                |
| Denmark              | 11            | 3.92           | 93.6                   | 7       | 3.88  | 17             | 3.89  | 16                      | 3.59  | 9                                | 3.98  | 14                   | 3.94  | 8          | 4.26  |                |
| Finland              | 12            | 3.92           | 93.5                   | 6       | 3.89  | 14             | 3.95  | 21                      | 3.56  | 14                               | 3.88  | 6                    | 4.10  | 15         | 4.17  |                |
| Switzerland          | 13            | 3.91           | 93.4                   | 12      | 3.75  | 9              | 4.07  | 20                      | 3.57  | 12                               | 3.92  | 10                   | 4.02  | 12         | 4.20  |                |
| United Arab Emirates | 14            | 3.89           | 92.8                   | 17      | 3.66  | 13             | 3.98  | 7                       | 3.76  | 16                               | 3.83  | 16                   | 3.89  | 10         | 4.23  |                |
| France               | 15            | 3.86           | 92.2                   | 18      | 3.63  | 12             | 4.00  | 15                      | 3.60  | 17                               | 3.82  | 12                   | 3.99  | 14         | 4.17  |                |
| Luxembourg           | 16            | 3.84           | 91.8                   | 16      | 3.67  | 18             | 3.84  | 11                      | 3.68  | 15                               | 3.83  | 22                   | 3.78  | 7          | 4.27  |                |
| Canada               | 17            | 3.81           | 90.9                   | 15      | 3.70  | 16             | 3.91  | 28                      | 3.45  | 13                               | 3.90  | 15                   | 3.91  | 21         | 4.03  |                |
| Spain                | 18            | 3.78           | 90.3                   | 21      | 3.57  | 22             | 3.79  | 9                       | 3.72  | 18                               | 3.78  | 21                   | 3.78  | 19         | 4.04  |                |
| Australia            | 19            | 3.77           | 90.0                   | 10      | 3.76  | 15             | 3.92  | 31                      | 3.40  | 19                               | 3.76  | 19                   | 3.83  | 22         | 4.00  |                |
| Norway               | 20            | 3.74           | 89.3                   | 19      | 3.62  | 19             | 3.84  | 27                      | 3.48  | 20                               | 3.75  | 18                   | 3.83  | 25         | 3.96  |                |
| Italy                | 21            | 3.73           | 89.2                   | 23      | 3.44  | 20             | 3.82  | 22                      | 3.55  | 23                               | 3.68  | 17                   | 3.84  | 18         | 4.09  |                |
| New Zealand          | 22            | 3.68           | 88.0                   | 20      | 3.58  | 21             | 3.79  | 36                      | 3.27  | 21                               | 3.69  | 24                   | 3.73  | 17         | 4.10  |                |
| Korea, Rep.          | 23            | 3.65           | 87.3                   | 24      | 3.43  | 23             | 3.75  | 29                      | 3.43  | 26                               | 3.63  | 23                   | 3.75  | 24         | 3.96  |                |
| Taiwan, China        | 24            | 3.65           | 87.2                   | 25      | 3.42  | 25             | 3.67  | 24                      | 3.54  | 24                               | 3.68  | 27                   | 3.67  | 27         | 3.93  |                |
| Ireland              | 25            | 3.63           | 86.8                   | 22      | 3.45  | 26             | 3.50  | 25                      | 3.53  | 22                               | 3.69  | 20                   | 3.79  | 30         | 3.85  |                |
| Czech Republic       | 26            | 3.62           | 86.4                   | 26      | 3.34  | 29             | 3.38  | 12                      | 3.65  | 25                               | 3.65  | 26                   | 3.68  | 23         | 3.98  |                |
| China                | 27            | 3.60           | 86.1                   | 30      | 3.28  | 24             | 3.73  | 18                      | 3.57  | 27                               | 3.58  | 28                   | 3.63  | 29         | 3.86  |                |
| Portugal             | 28            | 3.56           | 85.1                   | 32      | 3.24  | 35             | 3.23  | 17                      | 3.59  | 28                               | 3.54  | 25                   | 3.69  | 20         | 4.03  |                |
| South Africa         | 29            | 3.51           | 83.8                   | 29      | 3.29  | 28             | 3.39  | 26                      | 3.53  | 33                               | 3.42  | 30                   | 3.56  | 31         | 3.85  |                |
| Qatar                | 30            | 3.50           | 83.7                   | 35      | 3.18  | 27             | 3.43  | 13                      | 3.62  | 31                               | 3.46  | 31                   | 3.53  | 34         | 3.78  |                |
| Poland               | 31            | 3.50           | 83.5                   | 31      | 3.26  | 40             | 3.17  | 19                      | 3.57  | 29                               | 3.49  | 33                   | 3.49  | 26         | 3.94  |                |
| Hungary              | 32            | 3.41           | 81.5                   | 36      | 3.18  | 32             | 3.31  | 35                      | 3.29  | 36                               | 3.27  | 29                   | 3.61  | 32         | 3.82  |                |
| Israel               | 33            | 3.39           | 81.0                   | 27      | 3.32  | 31             | 3.33  | 61                      | 2.93  | 32                               | 3.44  | 32                   | 3.50  | 28         | 3.89  | 2012           |
| Thailand             | 34            | 3.36           | 80.2                   | 37      | 3.13  | 41             | 3.17  | 32                      | 3.40  | 35                               | 3.29  | 35                   | 3.38  | 36         | 3.75  |                |
| Malaysia             | 35            | 3.34           | 79.9                   | 38      | 3.06  | 33             | 3.30  | 30                      | 3.43  | 34                               | 3.34  | 38                   | 3.32  | 46         | 3.60  |                |
| Estonia              | 36            | 3.30           | 78.8                   | 28      | 3.30  | 43             | 3.13  | 41                      | 3.19  | 42                               | 3.15  | 46                   | 3.20  | 33         | 3.80  |                |
| Turkey               | 37            | 3.29           | 78.6                   | 47      | 2.94  | 30             | 3.36  | 40                      | 3.19  | 37                               | 3.23  | 36                   | 3.37  | 39         | 3.68  |                |
| Iceland              | 38            | 3.29           | 78.6                   | 40      | 3.02  | 39             | 3.18  | 55                      | 3.00  | 30                               | 3.48  | 34                   | 3.38  | 38         | 3.72  |                |
| Slovenia             | 39            | 3.29           | 78.5                   | 34      | 3.21  | 34             | 3.25  | 44                      | 3.16  | 41                               | 3.17  | 40                   | 3.30  | 41         | 3.65  |                |
| Chile                | 40            | 3.28           | 78.4                   | 33      | 3.23  | 45             | 3.09  | 37                      | 3.24  | 47                               | 3.09  | 39                   | 3.30  | 37         | 3.73  |                |
| Panama               | 41            | 3.26           | 77.8                   | 44      | 2.95  | 42             | 3.14  | 33                      | 3.35  | 38                               | 3.20  | 43                   | 3.25  | 42         | 3.63  |                |

| Economy                | Mean LPI rank | Mean LPI score | % of highest performer | Customs |       | Infrastructure |       | International shipments |       | Logistics quality and competence |       | Tracking and tracing |       | Timeliness |       | Missing values |
|------------------------|---------------|----------------|------------------------|---------|-------|----------------|-------|-------------------------|-------|----------------------------------|-------|----------------------|-------|------------|-------|----------------|
|                        | Rank          | Score          | Rank                   | Rank    | Score | Rank           | Score | Rank                    | Score | Rank                             | Score | Rank                 | Score | Rank       | Score |                |
| India                  | 42            | 3.22           | 77.0                   | 43      | 2.97  | 48             | 3.01  | 38                      | 3.24  | 39                               | 3.18  | 37                   | 3.33  | 50         | 3.57  |                |
| Lithuania              | 43            | 3.20           | 76.4                   | 41      | 3.02  | 49             | 3.00  | 54                      | 3.03  | 45                               | 3.10  | 42                   | 3.25  | 35         | 3.78  |                |
| Greece                 | 44            | 3.19           | 76.2                   | 49      | 2.88  | 36             | 3.19  | 48                      | 3.13  | 52                               | 3.02  | 41                   | 3.25  | 40         | 3.67  |                |
| Vietnam                | 45            | 3.16           | 75.5                   | 51      | 2.86  | 54             | 2.92  | 45                      | 3.15  | 40                               | 3.17  | 44                   | 3.23  | 47         | 3.60  |                |
| Oman                   | 46            | 3.16           | 75.5                   | 52      | 2.82  | 37             | 3.18  | 34                      | 3.29  | 50                               | 3.06  | 60                   | 2.96  | 44         | 3.61  |                |
| Slovak Republic        | 47            | 3.14           | 75.0                   | 46      | 2.94  | 44             | 3.09  | 42                      | 3.19  | 43                               | 3.13  | 57                   | 3.02  | 54         | 3.45  |                |
| Croatia                | 48            | 3.12           | 74.4                   | 42      | 3.01  | 47             | 3.02  | 56                      | 2.99  | 44                               | 3.10  | 55                   | 3.08  | 51         | 3.51  |                |
| Cyprus                 | 49            | 3.10           | 74.0                   | 39      | 3.04  | 53             | 2.94  | 53                      | 3.04  | 58                               | 2.93  | 59                   | 2.98  | 43         | 3.62  |                |
| Romania                | 50            | 3.10           | 74.0                   | 58      | 2.73  | 58             | 2.86  | 46                      | 3.15  | 53                               | 3.01  | 48                   | 3.19  | 45         | 3.61  |                |
| Indonesia              | 51            | 3.08           | 73.6                   | 62      | 2.69  | 61             | 2.81  | 51                      | 3.08  | 48                               | 3.07  | 45                   | 3.23  | 49         | 3.59  |                |
| Saudi Arabia           | 52            | 3.08           | 73.6                   | 60      | 2.70  | 38             | 3.18  | 52                      | 3.05  | 57                               | 2.94  | 47                   | 3.19  | 56         | 3.43  |                |
| Mexico                 | 53            | 3.08           | 73.6                   | 54      | 2.78  | 56             | 2.90  | 50                      | 3.09  | 49                               | 3.06  | 51                   | 3.14  | 52         | 3.49  |                |
| Bahrain                | 54            | 3.06           | 73.2                   | 50      | 2.88  | 57             | 2.89  | 49                      | 3.09  | 51                               | 3.03  | 50                   | 3.16  | 66         | 3.31  |                |
| Latvia                 | 55            | 3.02           | 72.3                   | 48      | 2.93  | 46             | 3.03  | 57                      | 2.97  | 59                               | 2.92  | 56                   | 3.06  | 69         | 3.25  |                |
| Brazil                 | 56            | 3.02           | 72.1                   | 85      | 2.52  | 51             | 2.99  | 65                      | 2.89  | 46                               | 3.10  | 49                   | 3.17  | 53         | 3.47  |                |
| Bulgaria               | 57            | 3.00           | 71.7                   | 55      | 2.77  | 64             | 2.71  | 43                      | 3.16  | 54                               | 2.96  | 63                   | 2.93  | 57         | 3.43  |                |
| Botswana               | 58            | 2.96           | 70.7                   | 45      | 2.95  | 59             | 2.85  | 73                      | 2.82  | 75                               | 2.71  | 77                   | 2.81  | 48         | 3.60  | 2018           |
| Kuwait                 | 59            | 2.96           | 70.6                   | 57      | 2.75  | 50             | 3.00  | 62                      | 2.91  | 63                               | 2.81  | 66                   | 2.88  | 59         | 3.39  |                |
| Egypt, Arab Rep.       | 60            | 2.95           | 70.5                   | 65      | 2.67  | 55             | 2.91  | 59                      | 2.94  | 55                               | 2.95  | 64                   | 2.91  | 67         | 3.30  |                |
| Malta                  | 61            | 2.94           | 70.3                   | 56      | 2.77  | 52             | 2.95  | 64                      | 2.91  | 61                               | 2.85  | 61                   | 2.95  | 71         | 3.24  |                |
| Argentina              | 62            | 2.93           | 70.0                   | 90      | 2.49  | 60             | 2.81  | 63                      | 2.91  | 62                               | 2.82  | 52                   | 3.13  | 58         | 3.41  |                |
| Kenya                  | 63            | 2.93           | 69.9                   | 67      | 2.66  | 67             | 2.68  | 70                      | 2.86  | 60                               | 2.88  | 53                   | 3.11  | 61         | 3.35  |                |
| Philippines            | 64            | 2.91           | 69.6                   | 70      | 2.62  | 71             | 2.67  | 39                      | 3.20  | 64                               | 2.80  | 58                   | 3.01  | 83         | 3.11  |                |
| Rwanda                 | 65            | 2.90           | 69.3                   | 64      | 2.68  | 76             | 2.60  | 47                      | 3.14  | 69                               | 2.77  | 73                   | 2.83  | 64         | 3.31  |                |
| Côte d'Ivoire          | 66            | 2.89           | 69.0                   | 68      | 2.66  | 69             | 2.67  | 58                      | 2.96  | 56                               | 2.95  | 62                   | 2.95  | 85         | 3.11  |                |
| Tanzania               | 67            | 2.88           | 68.8                   | 69      | 2.66  | 63             | 2.72  | 66                      | 2.89  | 65                               | 2.80  | 69                   | 2.85  | 62         | 3.34  | 2018           |
| Serbia                 | 68            | 2.83           | 67.7                   | 82      | 2.53  | 78             | 2.59  | 67                      | 2.89  | 68                               | 2.78  | 68                   | 2.86  | 63         | 3.32  |                |
| Ukraine                | 69            | 2.83           | 67.5                   | 95      | 2.46  | 105            | 2.38  | 81                      | 2.77  | 70                               | 2.76  | 54                   | 3.08  | 55         | 3.45  |                |
| Ecuador                | 70            | 2.82           | 67.4                   | 63      | 2.69  | 74             | 2.62  | 72                      | 2.82  | 77                               | 2.70  | 67                   | 2.87  | 75         | 3.22  |                |
| Colombia               | 71            | 2.81           | 67.1                   | 89      | 2.50  | 81             | 2.58  | 60                      | 2.93  | 66                               | 2.79  | 70                   | 2.84  | 80         | 3.17  |                |
| Uganda                 | 72            | 2.79           | 66.7                   | 53      | 2.78  | 96             | 2.45  | 74                      | 2.82  | 78                               | 2.70  | 86                   | 2.69  | 68         | 3.27  | 2012, 2014     |
| Brunei Darussalam      | 73            | 2.78           | 66.5                   | 61      | 2.70  | 77             | 2.59  | 84                      | 2.74  | 84                               | 2.64  | 75                   | 2.82  | 78         | 3.18  | 2012, 2014     |
| Peru                   | 74            | 2.78           | 66.5                   | 74      | 2.59  | 91             | 2.46  | 68                      | 2.88  | 87                               | 2.62  | 85                   | 2.72  | 60         | 3.36  |                |
| Uruguay                | 75            | 2.78           | 66.4                   | 73      | 2.60  | 82             | 2.57  | 80                      | 2.78  | 67                               | 2.79  | 74                   | 2.83  | 91         | 3.10  |                |
| Jordan                 | 76            | 2.78           | 66.3                   | 87      | 2.51  | 65             | 2.70  | 86                      | 2.74  | 83                               | 2.67  | 79                   | 2.79  | 70         | 3.24  |                |
| Kazakhstan             | 77            | 2.77           | 66.2                   | 78      | 2.57  | 79             | 2.59  | 87                      | 2.73  | 89                               | 2.60  | 78                   | 2.81  | 65         | 3.31  |                |
| Bosnia and Herzegovina | 78            | 2.76           | 65.8                   | 71      | 2.62  | 85             | 2.52  | 89                      | 2.70  | 74                               | 2.73  | 82                   | 2.75  | 77         | 3.20  |                |
| Costa Rica             | 79            | 2.74           | 65.4                   | 88      | 2.50  | 97             | 2.45  | 77                      | 2.79  | 81                               | 2.67  | 65                   | 2.88  | 92         | 3.09  |                |
| Namibia                | 80            | 2.73           | 65.1                   | 72      | 2.60  | 62             | 2.74  | 93                      | 2.68  | 86                               | 2.64  | 107                  | 2.55  | 81         | 3.14  | 2018           |
| Iran, Islamic Rep.     | 81            | 2.71           | 64.8                   | 96      | 2.46  | 70             | 2.67  | 94                      | 2.68  | 72                               | 2.76  | 95                   | 2.63  | 95         | 3.07  | 2014           |
| Lebanon                | 82            | 2.71           | 64.7                   | 98      | 2.45  | 75             | 2.61  | 82                      | 2.77  | 103                              | 2.52  | 72                   | 2.83  | 98         | 3.05  |                |
| Paraguay               | 83            | 2.70           | 64.6                   | 80      | 2.53  | 87             | 2.50  | 101                     | 2.66  | 76                               | 2.70  | 105                  | 2.56  | 73         | 3.23  |                |
| Malawi                 | 84            | 2.69           | 64.3                   | 76      | 2.58  | 83             | 2.56  | 103                     | 2.61  | 71                               | 2.76  | 92                   | 2.65  | 105        | 2.99  | 2016           |
| Russian Federation     | 85            | 2.69           | 64.2                   | 131     | 2.25  | 73             | 2.64  | 105                     | 2.59  | 73                               | 2.74  | 88                   | 2.67  | 74         | 3.23  |                |

| Economy               | Mean LPI rank | Mean LPI score | % of highest performer | Customs |       | Infrastructure |       | International shipments |       | Logistics quality and competence |       | Tracking and tracing |       | Timeliness |       | Missing values |
|-----------------------|---------------|----------------|------------------------|---------|-------|----------------|-------|-------------------------|-------|----------------------------------|-------|----------------------|-------|------------|-------|----------------|
|                       | Rank          | Score          | Rank                   | Rank    | Score | Rank           | Score | Rank                    | Score | Rank                             | Score | Rank                 | Score | Rank       | Score |                |
| Dominican Republic    | 86            | 2.68           | 64.1                   | 102     | 2.43  | 102            | 2.39  | 83                      | 2.77  | 93                               | 2.59  | 71                   | 2.84  | 99         | 3.03  |                |
| Morocco               | 87            | 2.67           | 63.8                   | 114     | 2.36  | 80             | 2.58  | 75                      | 2.80  | 92                               | 2.59  | 104                  | 2.57  | 93         | 3.09  | 2014           |
| El Salvador           | 88            | 2.66           | 63.6                   | 105     | 2.40  | 113            | 2.31  | 76                      | 2.79  | 82                               | 2.67  | 94                   | 2.63  | 88         | 3.10  |                |
| Cambodia              | 89            | 2.66           | 63.5                   | 94      | 2.47  | 120            | 2.26  | 69                      | 2.87  | 106                              | 2.50  | 93                   | 2.64  | 82         | 3.13  |                |
| Bahamas, The          | 90            | 2.65           | 63.3                   | 59      | 2.72  | 84             | 2.56  | 100                     | 2.66  | 105                              | 2.51  | 102                  | 2.58  | 118        | 2.87  |                |
| Mauritius             | 91            | 2.65           | 63.3                   | 86      | 2.51  | 68             | 2.68  | 137                     | 2.35  | 79                               | 2.69  | 84                   | 2.72  | 106        | 2.98  | 2016           |
| Sri Lanka             | 92            | 2.65           | 63.2                   | 77      | 2.57  | 104            | 2.39  | 108                     | 2.57  | 85                               | 2.64  | 81                   | 2.77  | 113        | 2.93  | 2016           |
| Benin                 | 93            | 2.65           | 63.2                   | 93      | 2.48  | 94             | 2.45  | 98                      | 2.66  | 107                              | 2.50  | 101                  | 2.58  | 79         | 3.17  |                |
| Montenegro            | 94            | 2.65           | 63.2                   | 91      | 2.49  | 93             | 2.46  | 92                      | 2.68  | 97                               | 2.55  | 108                  | 2.55  | 84         | 3.11  |                |
| Pakistan              | 95            | 2.64           | 62.9                   | 104     | 2.41  | 100            | 2.43  | 79                      | 2.79  | 80                               | 2.69  | 112                  | 2.52  | 112        | 2.93  |                |
| Burkina Faso          | 96            | 2.63           | 62.9                   | 101     | 2.44  | 89             | 2.48  | 78                      | 2.79  | 96                               | 2.56  | 126                  | 2.42  | 97         | 3.06  |                |
| Maldives              | 97            | 2.63           | 62.8                   | 97      | 2.46  | 72             | 2.64  | 104                     | 2.59  | 115                              | 2.42  | 103                  | 2.57  | 96         | 3.07  |                |
| Albania               | 98            | 2.62           | 62.5                   | 118     | 2.33  | 123            | 2.24  | 85                      | 2.74  | 95                               | 2.56  | 111                  | 2.52  | 72         | 3.24  | 2014           |
| Macedonia, FYR        | 99            | 2.62           | 62.5                   | 115     | 2.36  | 86             | 2.51  | 96                      | 2.66  | 90                               | 2.60  | 113                  | 2.52  | 100        | 3.01  |                |
| Bangladesh            | 100           | 2.60           | 62.0                   | 120     | 2.33  | 109            | 2.36  | 99                      | 2.66  | 94                               | 2.56  | 89                   | 2.67  | 108        | 2.97  | 2012           |
| Ghana                 | 101           | 2.60           | 62.0                   | 103     | 2.41  | 92             | 2.46  | 102                     | 2.63  | 104                              | 2.51  | 100                  | 2.58  | 109        | 2.95  |                |
| Mozambique            | 102           | 2.59           | 61.9                   | 100     | 2.45  | 130            | 2.22  | 71                      | 2.86  | 120                              | 2.38  | 96                   | 2.62  | 107        | 2.98  | 2012, 2018     |
| Nigeria               | 103           | 2.59           | 61.8                   | 145     | 2.15  | 88             | 2.50  | 118                     | 2.52  | 100                              | 2.54  | 83                   | 2.73  | 86         | 3.10  |                |
| Tunisia               | 104           | 2.59           | 61.8                   | 130     | 2.27  | 117            | 2.27  | 115                     | 2.53  | 113                              | 2.45  | 80                   | 2.78  | 76         | 3.20  |                |
| São Tomé and Príncipe | 105           | 2.56           | 61.3                   | 83      | 2.52  | 114            | 2.30  | 130                     | 2.44  | 99                               | 2.55  | 90                   | 2.66  | 116        | 2.90  |                |
| Honduras              | 106           | 2.56           | 61.2                   | 123     | 2.30  | 112            | 2.32  | 97                      | 2.66  | 91                               | 2.60  | 97                   | 2.61  | 121        | 2.85  |                |
| Algeria               | 107           | 2.56           | 61.1                   | 127     | 2.28  | 95             | 2.45  | 113                     | 2.54  | 101                              | 2.53  | 91                   | 2.65  | 117        | 2.89  |                |
| Nicaragua             | 108           | 2.56           | 61.0                   | 84      | 2.52  | 99             | 2.44  | 111                     | 2.54  | 98                               | 2.55  | 115                  | 2.49  | 129        | 2.77  | 2012, 2018     |
| Mali                  | 109           | 2.55           | 60.9                   | 136     | 2.22  | 116            | 2.28  | 95                      | 2.66  | 117                              | 2.40  | 76                   | 2.81  | 119        | 2.87  | 2012           |
| Belarus               | 110           | 2.54           | 60.6                   | 126     | 2.29  | 103            | 2.39  | 124                     | 2.47  | 102                              | 2.53  | 124                  | 2.44  | 87         | 3.10  |                |
| Jamaica               | 111           | 2.52           | 60.3                   | 99      | 2.45  | 106            | 2.36  | 114                     | 2.53  | 110                              | 2.48  | 120                  | 2.48  | 123        | 2.81  |                |
| Solomon Islands       | 112           | 2.52           | 60.2                   | 66      | 2.66  | 125            | 2.23  | 151                     | 2.24  | 88                               | 2.61  | 131                  | 2.37  | 102        | 3.00  |                |
| Moldova               | 113           | 2.52           | 60.1                   | 122     | 2.31  | 131            | 2.21  | 90                      | 2.69  | 123                              | 2.36  | 133                  | 2.36  | 90         | 3.10  |                |
| Comoros               | 114           | 2.51           | 60.1                   | 75      | 2.58  | 119            | 2.27  | 123                     | 2.47  | 129                              | 2.32  | 87                   | 2.67  | 132        | 2.74  |                |
| Guatemala             | 115           | 2.51           | 59.9                   | 116     | 2.35  | 118            | 2.27  | 126                     | 2.46  | 125                              | 2.35  | 117                  | 2.49  | 89         | 3.10  |                |
| Armenia               | 116           | 2.51           | 59.9                   | 107     | 2.39  | 101            | 2.39  | 110                     | 2.55  | 112                              | 2.45  | 128                  | 2.38  | 122        | 2.84  |                |
| Uzbekistan            | 117           | 2.50           | 59.7                   | 147     | 2.13  | 98             | 2.44  | 134                     | 2.38  | 109                              | 2.49  | 110                  | 2.54  | 101        | 3.01  |                |
| Zambia                | 118           | 2.49           | 59.4                   | 129     | 2.27  | 115            | 2.29  | 88                      | 2.72  | 111                              | 2.46  | 154                  | 2.18  | 110        | 2.94  | 2012           |
| Togo                  | 119           | 2.48           | 59.4                   | 119     | 2.33  | 127            | 2.23  | 106                     | 2.58  | 130                              | 2.29  | 114                  | 2.50  | 111        | 2.93  |                |
| Lao PDR               | 120           | 2.48           | 59.2                   | 111     | 2.37  | 128            | 2.23  | 116                     | 2.52  | 114                              | 2.45  | 119                  | 2.48  | 130        | 2.77  |                |
| Nepal                 | 121           | 2.45           | 58.6                   | 140     | 2.19  | 132            | 2.20  | 131                     | 2.40  | 122                              | 2.36  | 106                  | 2.56  | 104        | 2.99  |                |
| Guyana                | 122           | 2.45           | 58.6                   | 92      | 2.48  | 134            | 2.17  | 138                     | 2.35  | 121                              | 2.36  | 109                  | 2.55  | 127        | 2.79  |                |
| Azerbaijan            | 123           | 2.45           | 58.5                   | 81      | 2.53  | 66             | 2.69  | 109                     | 2.56  | 153                              | 2.14  | 153                  | 2.18  | 146        | 2.62  | 2016, 2018     |
| Georgia               | 124           | 2.45           | 58.5                   | 109     | 2.38  | 108            | 2.36  | 132                     | 2.38  | 139                              | 2.27  | 130                  | 2.37  | 114        | 2.92  |                |
| Cameroon              | 125           | 2.43           | 58.1                   | 128     | 2.27  | 111            | 2.36  | 119                     | 2.51  | 108                              | 2.50  | 132                  | 2.37  | 152        | 2.56  |                |
| Djibouti              | 126           | 2.43           | 58.1                   | 124     | 2.29  | 90             | 2.47  | 141                     | 2.33  | 154                              | 2.14  | 121                  | 2.46  | 115        | 2.91  |                |
| Trinidad and Tobago   | 127           | 2.41           | 57.5                   | 106     | 2.40  | 107            | 2.36  | 127                     | 2.46  | 134                              | 2.28  | 142                  | 2.27  | 139        | 2.65  | 2012, 2014     |
| Guinea-Bissau         | 128           | 2.40           | 57.4                   | 138     | 2.21  | 160            | 1.94  | 117                     | 2.52  | 131                              | 2.29  | 98                   | 2.60  | 124        | 2.80  |                |
| Mongolia              | 129           | 2.40           | 57.3                   | 132     | 2.25  | 142            | 2.12  | 128                     | 2.45  | 145                              | 2.23  | 149                  | 2.21  | 94         | 3.07  |                |
| Sudan                 | 130           | 2.40           | 57.3                   | 148     | 2.13  | 139            | 2.14  | 121                     | 2.49  | 116                              | 2.41  | 122                  | 2.45  | 134        | 2.73  |                |

| Economy                  | Mean LPI rank | Mean LPI score | % of highest performer | Customs |       | Infrastructure |       | International shipments |       | Logistics quality and competence |       | Tracking and tracing |       | Timeliness |       | Missing values |
|--------------------------|---------------|----------------|------------------------|---------|-------|----------------|-------|-------------------------|-------|----------------------------------|-------|----------------------|-------|------------|-------|----------------|
|                          | Rank          | Score          | Rank                   | Rank    | Score | Rank           | Score | Rank                    | Score | Rank                             | Score | Rank                 | Score | Rank       | Score |                |
| Ethiopia                 | 131           | 2.40           | 57.2                   | 79      | 2.54  | 140            | 2.13  | 112                     | 2.54  | 119                              | 2.39  | 145                  | 2.24  | 158        | 2.49  | 2018           |
| Kyrgyz Republic          | 132           | 2.38           | 57.0                   | 110     | 2.38  | 126            | 2.23  | 157                     | 2.20  | 147                              | 2.21  | 116                  | 2.49  | 126        | 2.79  |                |
| Congo, Rep.              | 133           | 2.38           | 56.7                   | 151     | 2.07  | 141            | 2.12  | 107                     | 2.58  | 142                              | 2.25  | 129                  | 2.38  | 125        | 2.80  |                |
| Fiji                     | 134           | 2.37           | 56.7                   | 113     | 2.37  | 110            | 2.36  | 148                     | 2.27  | 136                              | 2.27  | 136                  | 2.32  | 138        | 2.65  |                |
| Venezuela, RB            | 135           | 2.37           | 56.5                   | 160     | 1.94  | 124            | 2.24  | 120                     | 2.49  | 128                              | 2.32  | 123                  | 2.44  | 133        | 2.74  |                |
| Bolivia                  | 136           | 2.36           | 56.5                   | 134     | 2.24  | 138            | 2.16  | 122                     | 2.48  | 146                              | 2.21  | 140                  | 2.29  | 131        | 2.75  |                |
| Madagascar               | 137           | 2.35           | 56.1                   | 121     | 2.32  | 137            | 2.16  | 154                     | 2.22  | 141                              | 2.25  | 125                  | 2.42  | 136        | 2.70  |                |
| Gambia, The              | 138           | 2.34           | 56.0                   | 149     | 2.08  | 161            | 1.90  | 91                      | 2.68  | 144                              | 2.23  | 118                  | 2.48  | 150        | 2.60  | 2016           |
| Myanmar                  | 139           | 2.34           | 55.9                   | 137     | 2.21  | 145            | 2.11  | 155                     | 2.22  | 133                              | 2.28  | 135                  | 2.33  | 120        | 2.86  |                |
| Chad                     | 140           | 2.34           | 55.9                   | 143     | 2.15  | 121            | 2.26  | 136                     | 2.35  | 118                              | 2.39  | 141                  | 2.28  | 151        | 2.58  |                |
| Senegal                  | 141           | 2.34           | 55.8                   | 125     | 2.29  | 122            | 2.24  | 129                     | 2.44  | 137                              | 2.27  | 151                  | 2.19  | 153        | 2.56  |                |
| Turkmenistan             | 142           | 2.34           | 55.8                   | 133     | 2.25  | 129            | 2.23  | 135                     | 2.36  | 150                              | 2.20  | 137                  | 2.32  | 143        | 2.63  | 2012           |
| Congo, Dem. Rep.         | 143           | 2.33           | 55.6                   | 135     | 2.23  | 152            | 2.04  | 149                     | 2.26  | 126                              | 2.34  | 127                  | 2.41  | 141        | 2.65  |                |
| Papua New Guinea         | 144           | 2.31           | 55.2                   | 112     | 2.37  | 144            | 2.11  | 145                     | 2.29  | 159                              | 2.11  | 134                  | 2.36  | 147        | 2.61  |                |
| Guinea                   | 145           | 2.30           | 54.9                   | 108     | 2.39  | 166            | 1.80  | 133                     | 2.38  | 138                              | 2.27  | 99                   | 2.59  | 166        | 2.30  |                |
| Liberia                  | 146           | 2.29           | 54.7                   | 153     | 2.04  | 150            | 2.06  | 156                     | 2.22  | 143                              | 2.24  | 157                  | 2.15  | 103        | 2.99  |                |
| Tajikistan               | 147           | 2.29           | 54.6                   | 154     | 2.02  | 133            | 2.17  | 143                     | 2.32  | 132                              | 2.29  | 143                  | 2.26  | 142        | 2.65  |                |
| Niger                    | 148           | 2.29           | 54.6                   | 146     | 2.14  | 146            | 2.10  | 146                     | 2.28  | 140                              | 2.26  | 139                  | 2.29  | 145        | 2.62  |                |
| Yemen, Rep.              | 149           | 2.27           | 54.3                   | 150     | 2.08  | 151            | 2.05  | 142                     | 2.33  | 135                              | 2.27  | 144                  | 2.24  | 144        | 2.63  | 2016           |
| Central African Republic | 150           | 2.26           | 54.0                   | 117     | 2.35  | 135            | 2.17  | 150                     | 2.25  | 156                              | 2.13  | 150                  | 2.21  | 161        | 2.46  | 2016           |
| Bhutan                   | 151           | 2.25           | 53.7                   | 141     | 2.16  | 159            | 1.98  | 164                     | 2.12  | 124                              | 2.36  | 138                  | 2.31  | 155        | 2.54  |                |
| Cuba                     | 152           | 2.23           | 53.4                   | 144     | 2.15  | 148            | 2.09  | 144                     | 2.30  | 151                              | 2.20  | 155                  | 2.18  | 160        | 2.46  |                |
| Lesotho                  | 153           | 2.22           | 53.0                   | 139     | 2.20  | 153            | 2.02  | 162                     | 2.14  | 158                              | 2.12  | 148                  | 2.22  | 149        | 2.60  |                |
| Burundi                  | 154           | 2.22           | 53.0                   | 163     | 1.90  | 157            | 2.00  | 147                     | 2.28  | 127                              | 2.33  | 147                  | 2.23  | 154        | 2.55  |                |
| Libya                    | 155           | 2.21           | 52.9                   | 156     | 2.00  | 136            | 2.17  | 158                     | 2.18  | 148                              | 2.21  | 166                  | 1.90  | 128        | 2.78  |                |
| Equatorial Guinea        | 156           | 2.21           | 52.7                   | 158     | 1.99  | 164            | 1.82  | 125                     | 2.46  | 160                              | 2.11  | 158                  | 2.14  | 137        | 2.66  | 2012           |
| Mauritania               | 157           | 2.20           | 52.5                   | 142     | 2.16  | 147            | 2.09  | 161                     | 2.15  | 162                              | 2.06  | 156                  | 2.18  | 156        | 2.54  |                |
| Gabon                    | 158           | 2.19           | 52.3                   | 157     | 1.99  | 149            | 2.07  | 153                     | 2.23  | 155                              | 2.13  | 163                  | 2.06  | 148        | 2.61  |                |
| Iraq                     | 159           | 2.18           | 52.2                   | 162     | 1.90  | 158            | 2.00  | 140                     | 2.33  | 166                              | 1.98  | 160                  | 2.13  | 135        | 2.73  |                |
| Angola                   | 160           | 2.18           | 52.1                   | 166     | 1.79  | 156            | 2.01  | 139                     | 2.33  | 157                              | 2.13  | 159                  | 2.14  | 140        | 2.65  |                |
| Zimbabwe                 | 161           | 2.17           | 51.8                   | 155     | 2.01  | 155            | 2.01  | 163                     | 2.13  | 149                              | 2.20  | 152                  | 2.19  | 162        | 2.45  |                |
| Eritrea                  | 162           | 2.11           | 50.4                   | 152     | 2.05  | 162            | 1.89  | 165                     | 2.12  | 152                              | 2.19  | 162                  | 2.09  | 165        | 2.31  |                |
| Syrian Arab Republic     | 163           | 2.10           | 50.2                   | 167     | 1.70  | 143            | 2.12  | 166                     | 2.09  | 165                              | 2.00  | 146                  | 2.23  | 157        | 2.50  |                |
| Sierra Leone             | 164           | 2.06           | 49.3                   | 164     | 1.82  | 154            | 2.02  | 160                     | 2.15  | 167                              | 1.96  | 161                  | 2.10  | 164        | 2.31  | 2014           |
| Afghanistan              | 165           | 2.04           | 48.7                   | 161     | 1.91  | 163            | 1.83  | 159                     | 2.18  | 163                              | 2.02  | 167                  | 1.76  | 159        | 2.48  |                |
| Haiti                    | 166           | 2.02           | 48.3                   | 159     | 1.96  | 165            | 1.81  | 167                     | 1.98  | 164                              | 2.02  | 164                  | 1.96  | 163        | 2.37  |                |
| Somalia                  | 167           | 2.00           | 47.7                   | 165     | 1.81  | 167            | 1.69  | 152                     | 2.24  | 161                              | 2.07  | 165                  | 1.94  | 167        | 2.18  | 2012           |

Source: Logistics Performance Index 2012, 2014, 2016 and 2018.

Note: The LPI index is a multidimensional assessment of logistics performance, rated on a scale from 1 (worst) to 5 (best). The six core components captured by the LPI survey are rated by respondents on a scale of 1–5, where 1 is very low or very difficult and 5 is very high or very easy, except for question 15, where 1 is hardly ever and 5 is nearly always. The relative LPI score is obtained by normalizing the LPI score: Percentage of highest performer =  $100 \times [\text{LPI} - 1] / [\text{LPI highest} - 1]$ . Thus, the best performer has the maximum relative LPI score of 100 percent.

## Methodology for computing the aggregated International LPI

Scores of the six components across the four most recent LPI surveys were used to generate a "big picture" to better indicate countries' logistics performance. This approach reduces random variation from one LPI survey to another and enables the comparison of 167 countries. Each year's scores in each component were given weights: 6.7 percent for 2012, 13.3 percent for 2014, 26.7 percent for 2016, and 53.3 percent for 2018. In this way, the most recent data carry the highest weight.

We compute aggregated the score over 2018, 2016, 2014, and 2012 in the following way.

First, we fill missing values, according to:

$\text{Score14} = \text{Score12}$  if Score 14 is missing

$\text{Score16} = \text{Score14}$  if Score 16 is missing

$\text{Score18} = \text{Score16}$  if Score 18 is missing

Then:

$\text{Score16} = \text{Score18}$  if Score 16 is still missing

$\text{Score14} = \text{Score16}$  if Score 14 is still missing

$\text{Score12} = \text{Score14}$  if Score 12 is missing

For example, the following table:

| Score18        | Score16        | Score14        | Score12        |
|----------------|----------------|----------------|----------------|
| a <sub>1</sub> | a <sub>2</sub> | a <sub>3</sub> | .              |
| b <sub>1</sub> | .              | b <sub>3</sub> | .              |
| .              | c <sub>2</sub> | .              | c <sub>4</sub> |
| .              | .              | d <sub>3</sub> | d <sub>4</sub> |
| e <sub>1</sub> | e <sub>2</sub> | .              | .              |

would be extrapolated in this way:

| Score18        | Score16        | Score14        | Score12        |
|----------------|----------------|----------------|----------------|
| a <sub>1</sub> | a <sub>2</sub> | a <sub>3</sub> | a <sub>3</sub> |
| b <sub>1</sub> | b <sub>3</sub> | b <sub>3</sub> | b <sub>3</sub> |
| c <sub>2</sub> | c <sub>2</sub> | c <sub>4</sub> | c <sub>4</sub> |
| d <sub>3</sub> | d <sub>3</sub> | d <sub>3</sub> | d <sub>4</sub> |
| e <sub>1</sub> | e <sub>2</sub> | e <sub>2</sub> | e <sub>2</sub> |

Second, we weight the values in the following way:

Consolidated score = 8w\*Score18 + 4w\*Score16 + 2w\*Score14 + w\*Score12

So that: w = 0.067, 2w = 0.133, 4w = 0.267, 8w = 0.533.

**APPENDIX**  
**2**

## International LPI results for 2018, with bounds

| Economy              | LPI rank |             |             | LPI score |             |             | % of highest performer | Customs |       | Infrastructure |       | International shipments |       | Logistics quality and competence |       | Tracking and tracing |       | Timeliness |       |
|----------------------|----------|-------------|-------------|-----------|-------------|-------------|------------------------|---------|-------|----------------|-------|-------------------------|-------|----------------------------------|-------|----------------------|-------|------------|-------|
|                      | Rank     | Lower bound | Upper bound | Score     | Lower bound | Upper bound |                        | Rank    | Score | Rank           | Score | Rank                    | Score | Rank                             | Score | Rank                 | Score | Rank       | Score |
| Germany              | 1        | 1           | 1           | 4.20      | 4.16        | 4.25        | 100.0                  | 1       | 4.09  | 1              | 4.37  | 4                       | 3.86  | 1                                | 4.31  | 2                    | 4.24  | 3          | 4.39  |
| Sweden               | 2        | 2           | 12          | 4.05      | 3.90        | 4.20        | 95.4                   | 2       | 4.05  | 3              | 4.24  | 2                       | 3.92  | 10                               | 3.98  | 17                   | 3.88  | 7          | 4.28  |
| Belgium              | 3        | 2           | 12          | 4.04      | 3.92        | 4.16        | 94.9                   | 14      | 3.66  | 14             | 3.98  | 1                       | 3.99  | 2                                | 4.13  | 9                    | 4.05  | 1          | 4.41  |
| Austria              | 4        | 2           | 14          | 4.03      | 3.88        | 4.17        | 94.5                   | 12      | 3.71  | 5              | 4.18  | 3                       | 3.88  | 6                                | 4.08  | 7                    | 4.09  | 12         | 4.25  |
| Japan                | 5        | 2           | 10          | 4.03      | 3.96        | 4.09        | 94.5                   | 3       | 3.99  | 2              | 4.25  | 14                      | 3.59  | 4                                | 4.09  | 10                   | 4.05  | 10         | 4.25  |
| Netherlands          | 6        | 2           | 11          | 4.02      | 3.95        | 4.09        | 94.3                   | 5       | 3.92  | 4              | 4.21  | 11                      | 3.68  | 5                                | 4.09  | 11                   | 4.02  | 11         | 4.25  |
| Singapore            | 7        | 2           | 15          | 4.00      | 3.86        | 4.13        | 93.6                   | 6       | 3.89  | 6              | 4.06  | 15                      | 3.58  | 3                                | 4.10  | 8                    | 4.08  | 6          | 4.32  |
| Denmark              | 8        | 2           | 17          | 3.99      | 3.82        | 4.16        | 93.5                   | 4       | 3.92  | 17             | 3.96  | 19                      | 3.53  | 9                                | 4.01  | 3                    | 4.18  | 2          | 4.41  |
| United Kingdom       | 9        | 3           | 11          | 3.99      | 3.93        | 4.05        | 93.3                   | 11      | 3.77  | 8              | 4.03  | 13                      | 3.67  | 7                                | 4.05  | 4                    | 4.11  | 5          | 4.33  |
| Finland              | 10       | 1           | 21          | 3.97      | 3.68        | 4.26        | 92.7                   | 8       | 3.82  | 11             | 4.00  | 16                      | 3.56  | 15                               | 3.89  | 1                    | 4.32  | 8          | 4.28  |
| United Arab Emirates | 11       | 2           | 15          | 3.96      | 3.86        | 4.05        | 92.3                   | 15      | 3.63  | 10             | 4.02  | 5                       | 3.85  | 13                               | 3.92  | 13                   | 3.96  | 4          | 4.38  |
| Hong Kong SAR, China | 12       | 7           | 17          | 3.92      | 3.83        | 4.01        | 91.2                   | 9       | 3.81  | 15             | 3.97  | 8                       | 3.77  | 12                               | 3.93  | 15                   | 3.92  | 15         | 4.14  |
| Switzerland          | 13       | 7           | 17          | 3.90      | 3.80        | 4.00        | 90.6                   | 16      | 3.63  | 9              | 4.02  | 20                      | 3.51  | 11                               | 3.97  | 5                    | 4.10  | 13         | 4.24  |
| United States        | 14       | 12          | 17          | 3.89      | 3.83        | 3.94        | 90.1                   | 10      | 3.78  | 7              | 4.05  | 23                      | 3.51  | 16                               | 3.87  | 6                    | 4.09  | 19         | 4.08  |
| New Zealand          | 15       | 2           | 23          | 3.88      | 3.63        | 4.12        | 89.8                   | 13      | 3.71  | 13             | 3.99  | 27                      | 3.43  | 8                                | 4.02  | 16                   | 3.92  | 9          | 4.26  |
| France               | 16       | 14          | 17          | 3.84      | 3.79        | 3.90        | 88.8                   | 19      | 3.59  | 12             | 4.00  | 17                      | 3.55  | 17                               | 3.84  | 12                   | 4.00  | 14         | 4.15  |
| Spain                | 17       | 12          | 18          | 3.83      | 3.74        | 3.92        | 88.4                   | 17      | 3.62  | 19             | 3.84  | 6                       | 3.83  | 18                               | 3.80  | 19                   | 3.83  | 20         | 4.06  |
| Australia            | 18       | 14          | 26          | 3.75      | 3.60        | 3.90        | 85.9                   | 7       | 3.87  | 16             | 3.97  | 40                      | 3.25  | 21                               | 3.71  | 20                   | 3.82  | 21         | 3.98  |
| Italy                | 19       | 18          | 22          | 3.74      | 3.68        | 3.80        | 85.6                   | 23      | 3.47  | 18             | 3.85  | 21                      | 3.51  | 24                               | 3.66  | 18                   | 3.85  | 17         | 4.13  |
| Canada               | 20       | 14          | 27          | 3.73      | 3.56        | 3.89        | 85.2                   | 18      | 3.60  | 21             | 3.75  | 30                      | 3.38  | 14                               | 3.90  | 21                   | 3.81  | 22         | 3.96  |
| Norway               | 21       | 12          | 30          | 3.70      | 3.45        | 3.94        | 84.2                   | 21      | 3.52  | 24             | 3.69  | 26                      | 3.43  | 23                               | 3.69  | 14                   | 3.94  | 24         | 3.94  |
| Czech Republic       | 22       | 17          | 28          | 3.68      | 3.53        | 3.83        | 83.7                   | 30      | 3.29  | 26             | 3.46  | 10                      | 3.75  | 20                               | 3.72  | 24                   | 3.70  | 16         | 4.13  |
| Portugal             | 23       | 16          | 30          | 3.64      | 3.44        | 3.85        | 82.6                   | 35      | 3.17  | 32             | 3.25  | 7                       | 3.83  | 22                               | 3.71  | 23                   | 3.72  | 18         | 4.13  |
| Luxembourg           | 24       | 18          | 30          | 3.63      | 3.45        | 3.81        | 82.2                   | 20      | 3.53  | 25             | 3.63  | 31                      | 3.37  | 19                               | 3.76  | 29                   | 3.61  | 26         | 3.90  |
| Korea, Rep.          | 25       | 20          | 29          | 3.61      | 3.49        | 3.74        | 81.6                   | 25      | 3.40  | 22             | 3.73  | 33                      | 3.33  | 28                               | 3.59  | 22                   | 3.75  | 25         | 3.92  |
| China                | 26       | 23          | 27          | 3.61      | 3.55        | 3.66        | 81.4                   | 31      | 3.29  | 20             | 3.75  | 18                      | 3.54  | 27                               | 3.59  | 27                   | 3.65  | 27         | 3.84  |
| Taiwan, China        | 27       | 18          | 31          | 3.60      | 3.42        | 3.78        | 81.2                   | 22      | 3.47  | 23             | 3.72  | 24                      | 3.48  | 30                               | 3.57  | 25                   | 3.67  | 35         | 3.72  |
| Poland               | 28       | 20          | 33          | 3.54      | 3.35        | 3.73        | 79.3                   | 33      | 3.25  | 35             | 3.21  | 12                      | 3.68  | 29                               | 3.58  | 31                   | 3.51  | 23         | 3.95  |
| Ireland              | 29       | 20          | 37          | 3.51      | 3.28        | 3.74        | 78.4                   | 26      | 3.36  | 29             | 3.29  | 28                      | 3.42  | 26                               | 3.60  | 28                   | 3.62  | 33         | 3.76  |
| Qatar                | 30       | 19          | 41          | 3.47      | 3.21        | 3.74        | 77.3                   | 38      | 3.00  | 27             | 3.38  | 9                       | 3.75  | 31                               | 3.42  | 30                   | 3.56  | 36         | 3.70  |
| Hungary              | 31       | 28          | 39          | 3.42      | 3.25        | 3.59        | 75.6                   | 27      | 3.35  | 30             | 3.27  | 43                      | 3.22  | 38                               | 3.21  | 26                   | 3.67  | 32         | 3.79  |
| Thailand             | 32       | 29          | 37          | 3.41      | 3.29        | 3.53        | 75.3                   | 36      | 3.14  | 41             | 3.14  | 25                      | 3.46  | 32                               | 3.41  | 33                   | 3.47  | 28         | 3.81  |
| South Africa         | 33       | 30          | 39          | 3.38      | 3.25        | 3.51        | 74.2                   | 34      | 3.17  | 36             | 3.19  | 22                      | 3.51  | 39                               | 3.19  | 35                   | 3.41  | 34         | 3.74  |
| Chile                | 34       | 31          | 41          | 3.32      | 3.21        | 3.43        | 72.4                   | 32      | 3.27  | 34             | 3.21  | 38                      | 3.27  | 43                               | 3.13  | 44                   | 3.20  | 31         | 3.80  |
| Slovenia             | 35       | 28          | 49          | 3.31      | 3.08        | 3.55        | 72.3                   | 24      | 3.42  | 31             | 3.26  | 47                      | 3.19  | 50                               | 3.05  | 40                   | 3.27  | 38         | 3.70  |
| Estonia              | 36       | 28          | 50          | 3.31      | 3.06        | 3.56        | 72.2                   | 28      | 3.32  | 44             | 3.10  | 39                      | 3.26  | 40                               | 3.15  | 43                   | 3.21  | 30         | 3.80  |
| Israel               | 37       | 30          | 47          | 3.31      | 3.13        | 3.49        | 72.1                   | 29      | 3.32  | 28             | 3.33  | 75                      | 2.78  | 34                               | 3.39  | 32                   | 3.50  | 48         | 3.59  |
| Panama               | 38       | 31          | 47          | 3.28      | 3.12        | 3.43        | 71.1                   | 45      | 2.87  | 42             | 3.13  | 34                      | 3.31  | 35                               | 3.33  | 36                   | 3.40  | 46         | 3.60  |
| Vietnam              | 39       | 31          | 48          | 3.27      | 3.11        | 3.44        | 71.0                   | 41      | 2.95  | 47             | 3.01  | 49                      | 3.16  | 33                               | 3.40  | 34                   | 3.45  | 40         | 3.67  |
| Iceland              | 40       | 23          | 72          | 3.23      | 2.80        | 3.65        | 69.5                   | 54      | 2.77  | 37             | 3.19  | 72                      | 2.79  | 25                               | 3.61  | 37                   | 3.35  | 37         | 3.70  |
| Malaysia             | 41       | 31          | 55          | 3.22      | 3.00        | 3.44        | 69.4                   | 43      | 2.90  | 40             | 3.15  | 32                      | 3.35  | 36                               | 3.30  | 47                   | 3.15  | 53         | 3.46  |
| Greece               | 42       | 34          | 51          | 3.20      | 3.04        | 3.37        | 68.9                   | 47      | 2.84  | 38             | 3.17  | 35                      | 3.30  | 48                               | 3.06  | 45                   | 3.18  | 42         | 3.66  |

| Economy                | LPI rank |             |             | LPI score |             |             | % of highest performer | Customs |       | Infrastructure |       | International shipments |       | Logistics quality and competence |       | Tracking and tracing |       | Timeliness |       |
|------------------------|----------|-------------|-------------|-----------|-------------|-------------|------------------------|---------|-------|----------------|-------|-------------------------|-------|----------------------------------|-------|----------------------|-------|------------|-------|
|                        | Rank     | Lower bound | Upper bound | Score     | Lower bound | Upper bound |                        | Rank    | Score | Rank           | Score | Rank                    | Score | Rank                             | Score | Rank                 | Score | Rank       | Score |
|                        |          |             |             |           |             |             |                        |         |       |                |       |                         |       |                                  |       |                      |       |            |       |
| Oman                   | 43       | 31          | 59          | 3.20      | 2.93        | 3.47        | 68.6                   | 44      | 2.87  | 39             | 3.16  | 36                      | 3.30  | 49                               | 3.05  | 66                   | 2.97  | 29         | 3.80  |
| India                  | 44       | 40          | 49          | 3.18      | 3.10        | 3.26        | 68.0                   | 40      | 2.96  | 52             | 2.91  | 44                      | 3.21  | 42                               | 3.13  | 38                   | 3.32  | 52         | 3.50  |
| Cyprus                 | 45       | 31          | 64          | 3.15      | 2.85        | 3.45        | 67.2                   | 37      | 3.05  | 55             | 2.89  | 50                      | 3.15  | 53                               | 3.00  | 48                   | 3.15  | 45         | 3.62  |
| Indonesia              | 46       | 31          | 64          | 3.15      | 2.85        | 3.45        | 67.2                   | 62      | 2.67  | 54             | 2.89  | 42                      | 3.23  | 44                               | 3.10  | 39                   | 3.30  | 41         | 3.67  |
| Turkey                 | 47       | 40          | 51          | 3.15      | 3.05        | 3.24        | 67.0                   | 58      | 2.71  | 33             | 3.21  | 53                      | 3.06  | 51                               | 3.05  | 42                   | 3.23  | 44         | 3.63  |
| Romania                | 48       | 40          | 55          | 3.12      | 3.01        | 3.23        | 66.2                   | 80      | 2.58  | 51             | 2.91  | 48                      | 3.18  | 47                               | 3.07  | 41                   | 3.26  | 39         | 3.68  |
| Croatia                | 49       | 34          | 65          | 3.10      | 2.84        | 3.37        | 65.7                   | 39      | 2.98  | 46             | 3.01  | 58                      | 2.93  | 45                               | 3.10  | 61                   | 3.01  | 47         | 3.59  |
| Côte d'Ivoire          | 50       | 38          | 63          | 3.08      | 2.86        | 3.30        | 65.0                   | 51      | 2.78  | 56             | 2.89  | 45                      | 3.21  | 37                               | 3.23  | 49                   | 3.14  | 71         | 3.23  |
| Mexico                 | 51       | 43          | 60          | 3.05      | 2.90        | 3.20        | 64.1                   | 53      | 2.77  | 57             | 2.85  | 51                      | 3.10  | 52                               | 3.02  | 62                   | 3.00  | 49         | 3.53  |
| Bulgaria               | 52       | 40          | 64          | 3.03      | 2.84        | 3.23        | 63.5                   | 42      | 2.94  | 64             | 2.76  | 41                      | 3.23  | 55                               | 2.88  | 59                   | 3.02  | 65         | 3.31  |
| Slovak Republic        | 53       | 34          | 82          | 3.03      | 2.69        | 3.36        | 63.3                   | 50      | 2.79  | 48             | 3.00  | 52                      | 3.10  | 41                               | 3.14  | 64                   | 2.99  | 86         | 3.14  |
| Lithuania              | 54       | 38          | 74          | 3.02      | 2.76        | 3.28        | 63.0                   | 46      | 2.85  | 66             | 2.73  | 74                      | 2.79  | 54                               | 2.96  | 50                   | 3.12  | 43         | 3.65  |
| Saudi Arabia           | 55       | 44          | 66          | 3.01      | 2.83        | 3.19        | 62.8                   | 66      | 2.66  | 43             | 3.11  | 56                      | 2.99  | 57                               | 2.86  | 46                   | 3.17  | 67         | 3.30  |
| Brazil                 | 56       | 48          | 64          | 2.99      | 2.85        | 3.12        | 62.0                   | 102     | 2.41  | 50             | 2.93  | 61                      | 2.88  | 46                               | 3.09  | 51                   | 3.11  | 51         | 3.51  |
| Rwanda                 | 57       | 38          | 86          | 2.97      | 2.66        | 3.29        | 61.7                   | 64      | 2.67  | 65             | 2.76  | 29                      | 3.39  | 60                               | 2.85  | 86                   | 2.75  | 61         | 3.35  |
| Colombia               | 58       | 49          | 74          | 2.94      | 2.77        | 3.11        | 60.6                   | 75      | 2.61  | 72             | 2.67  | 46                      | 3.19  | 56                               | 2.87  | 53                   | 3.08  | 81         | 3.17  |
| Bahrain                | 59       | 48          | 76          | 2.93      | 2.75        | 3.12        | 60.4                   | 63      | 2.67  | 68             | 2.72  | 55                      | 3.02  | 58                               | 2.86  | 60                   | 3.01  | 68         | 3.29  |
| Philippines            | 60       | 51          | 77          | 2.90      | 2.73        | 3.07        | 59.5                   | 85      | 2.53  | 67             | 2.73  | 37                      | 3.29  | 69                               | 2.78  | 57                   | 3.06  | 100        | 2.98  |
| Argentina              | 61       | 57          | 72          | 2.89      | 2.80        | 2.98        | 58.9                   | 98      | 2.42  | 62             | 2.77  | 59                      | 2.92  | 68                               | 2.78  | 58                   | 3.05  | 58         | 3.37  |
| Ecuador                | 62       | 52          | 79          | 2.88      | 2.72        | 3.05        | 58.8                   | 48      | 2.80  | 69             | 2.72  | 80                      | 2.75  | 70                               | 2.75  | 55                   | 3.07  | 75         | 3.19  |
| Kuwait                 | 63       | 44          | 108         | 2.86      | 2.54        | 3.18        | 58.1                   | 56      | 2.73  | 45             | 3.02  | 98                      | 2.63  | 67                               | 2.80  | 96                   | 2.66  | 59         | 3.37  |
| Iran, Islamic Rep.     | 64       | 43          | 114         | 2.85      | 2.50        | 3.20        | 57.9                   | 71      | 2.63  | 63             | 2.77  | 79                      | 2.76  | 62                               | 2.84  | 85                   | 2.77  | 60         | 3.36  |
| Serbia                 | 65       | 50          | 96          | 2.84      | 2.59        | 3.09        | 57.5                   | 78      | 2.60  | 74             | 2.60  | 57                      | 2.97  | 80                               | 2.70  | 76                   | 2.79  | 62         | 3.33  |
| Ukraine                | 66       | 52          | 91          | 2.83      | 2.62        | 3.04        | 57.2                   | 89      | 2.49  | 119            | 2.22  | 68                      | 2.83  | 61                               | 2.84  | 52                   | 3.11  | 56         | 3.42  |
| Egypt, Arab Rep.       | 67       | 45          | 115         | 2.82      | 2.48        | 3.17        | 57.0                   | 77      | 2.60  | 58             | 2.82  | 73                      | 2.79  | 63                               | 2.82  | 89                   | 2.72  | 74         | 3.19  |
| Kenya                  | 68       | 55          | 91          | 2.81      | 2.62        | 3.01        | 56.7                   | 67      | 2.65  | 79             | 2.55  | 99                      | 2.62  | 64                               | 2.81  | 56                   | 3.07  | 79         | 3.18  |
| Malta                  | 69       | 42          | 125         | 2.81      | 2.41        | 3.21        | 56.7                   | 60      | 2.70  | 53             | 2.90  | 89                      | 2.70  | 66                               | 2.80  | 75                   | 2.80  | 98         | 3.01  |
| Latvia                 | 70       | 56          | 90          | 2.81      | 2.62        | 3.00        | 56.5                   | 49      | 2.80  | 49             | 2.98  | 81                      | 2.74  | 81                               | 2.69  | 77                   | 2.79  | 113        | 2.88  |
| Kazakhstan             | 71       | 56          | 90          | 2.81      | 2.63        | 2.99        | 56.5                   | 65      | 2.66  | 81             | 2.55  | 84                      | 2.73  | 90                               | 2.58  | 83                   | 2.78  | 50         | 3.53  |
| Bosnia and Herzegovina | 72       | 56          | 91          | 2.81      | 2.62        | 3.00        | 56.5                   | 69      | 2.63  | 97             | 2.42  | 66                      | 2.84  | 65                               | 2.80  | 70                   | 2.89  | 72         | 3.21  |
| Costa Rica             | 73       | 58          | 90          | 2.79      | 2.63        | 2.95        | 56.0                   | 70      | 2.63  | 84             | 2.49  | 76                      | 2.78  | 79                               | 2.70  | 67                   | 2.96  | 83         | 3.16  |
| Paraguay               | 74       | 56          | 98          | 2.78      | 2.58        | 2.99        | 55.7                   | 68      | 2.64  | 80             | 2.55  | 91                      | 2.69  | 76                               | 2.72  | 101                  | 2.61  | 55         | 3.45  |
| Russian Federation     | 75       | 63          | 89          | 2.76      | 2.65        | 2.87        | 54.9                   | 97      | 2.42  | 61             | 2.78  | 96                      | 2.64  | 71                               | 2.75  | 97                   | 2.65  | 66         | 3.31  |
| Benin                  | 76       | 58          | 109         | 2.75      | 2.54        | 2.96        | 54.7                   | 82      | 2.56  | 83             | 2.50  | 83                      | 2.73  | 98                               | 2.50  | 87                   | 2.75  | 57         | 3.42  |
| Montenegro             | 77       | 60          | 106         | 2.75      | 2.56        | 2.93        | 54.5                   | 83      | 2.56  | 75             | 2.57  | 92                      | 2.68  | 74                               | 2.72  | 105                  | 2.58  | 63         | 3.33  |
| Mauritius              | 78       | 55          | 116         | 2.73      | 2.45        | 3.01        | 54.1                   | 59      | 2.70  | 59             | 2.80  | 151                     | 2.12  | 59                               | 2.86  | 63                   | 3.00  | 99         | 3.00  |
| Lebanon                | 79       | 56          | 119         | 2.72      | 2.43        | 3.00        | 53.6                   | 106     | 2.38  | 73             | 2.64  | 70                      | 2.80  | 104                              | 2.47  | 74                   | 2.80  | 77         | 3.18  |
| Brunei Darussalam      | 80       | 60          | 114         | 2.71      | 2.51        | 2.91        | 53.3                   | 73      | 2.62  | 89             | 2.46  | 113                     | 2.51  | 77                               | 2.71  | 88                   | 2.75  | 80         | 3.17  |
| Macedonia, FYR         | 81       | 58          | 119         | 2.70      | 2.44        | 2.97        | 53.3                   | 91      | 2.45  | 87             | 2.47  | 67                      | 2.84  | 72                               | 2.74  | 100                  | 2.64  | 96         | 3.03  |
| Lao PDR                | 82       | 60          | 115         | 2.70      | 2.47        | 2.93        | 53.1                   | 74      | 2.61  | 91             | 2.44  | 85                      | 2.72  | 83                               | 2.65  | 69                   | 2.91  | 117        | 2.84  |
| Peru                   | 83       | 60          | 115         | 2.69      | 2.48        | 2.91        | 52.9                   | 86      | 2.53  | 111            | 2.28  | 65                      | 2.84  | 110                              | 2.42  | 108                  | 2.55  | 54         | 3.45  |
| Jordan                 | 84       | 64          | 112         | 2.69      | 2.52        | 2.86        | 52.7                   | 88      | 2.49  | 70             | 2.72  | 119                     | 2.44  | 93                               | 2.55  | 84                   | 2.77  | 76         | 3.18  |
| Uruguay                | 85       | 63          | 114         | 2.69      | 2.50        | 2.87        | 52.6                   | 87      | 2.51  | 94             | 2.43  | 82                      | 2.73  | 78                               | 2.71  | 82                   | 2.78  | 109        | 2.91  |

| Economy               | LPI rank |             |             | LPI score |             |             | % of highest performer | Customs |       | Infrastructure |       | International shipments |       | Logistics quality and competence |       | Tracking and tracing |       | Timeliness |       |
|-----------------------|----------|-------------|-------------|-----------|-------------|-------------|------------------------|---------|-------|----------------|-------|-------------------------|-------|----------------------------------|-------|----------------------|-------|------------|-------|
|                       | Rank     | Lower bound | Upper bound | Score     | Lower bound | Upper bound |                        | Rank    | Score | Rank           | Score | Rank                    | Score | Rank                             | Score | Rank                 | Score | Rank       | Score |
|                       |          |             |             |           |             |             |                        |         |       |                |       |                         |       |                                  |       |                      |       |            |       |
| Maldives              | 86       | 61          | 119         | 2.67      | 2.44        | 2.89        | 52.0                   | 105     | 2.40  | 71             | 2.72  | 94                      | 2.66  | 125                              | 2.29  | 104                  | 2.60  | 64         | 3.32  |
| Dominican Republic    | 87       | 66          | 115         | 2.66      | 2.49        | 2.84        | 51.9                   | 103     | 2.41  | 105            | 2.36  | 77                      | 2.77  | 108                              | 2.44  | 65                   | 2.97  | 101        | 2.98  |
| Albania               | 88       | 64          | 115         | 2.66      | 2.46        | 2.86        | 51.8                   | 114     | 2.35  | 110            | 2.29  | 69                      | 2.82  | 92                               | 2.56  | 95                   | 2.67  | 73         | 3.20  |
| São Tomé and Príncipe | 89       | 66          | 115         | 2.65      | 2.47        | 2.84        | 51.6                   | 57      | 2.71  | 106            | 2.33  | 121                     | 2.42  | 84                               | 2.65  | 81                   | 2.78  | 97         | 3.01  |
| Djibouti              | 90       | 61          | 130         | 2.63      | 2.37        | 2.90        | 51.1                   | 113     | 2.35  | 60             | 2.79  | 118                     | 2.45  | 135                              | 2.25  | 72                   | 2.85  | 85         | 3.15  |
| Burkina Faso          | 91       | 61          | 133         | 2.62      | 2.34        | 2.90        | 50.6                   | 100     | 2.41  | 95             | 2.43  | 60                      | 2.92  | 106                              | 2.46  | 124                  | 2.40  | 95         | 3.04  |
| Armenia               | 92       | 73          | 122         | 2.61      | 2.42        | 2.80        | 50.2                   | 81      | 2.57  | 86             | 2.48  | 95                      | 2.65  | 97                               | 2.50  | 113                  | 2.51  | 111        | 2.90  |
| Honduras              | 93       | 76          | 116         | 2.60      | 2.45        | 2.76        | 50.1                   | 125     | 2.24  | 88             | 2.47  | 93                      | 2.66  | 75                               | 2.72  | 93                   | 2.68  | 118        | 2.83  |
| Sri Lanka             | 94       | 63          | 135         | 2.60      | 2.32        | 2.87        | 49.9                   | 79      | 2.58  | 85             | 2.49  | 112                     | 2.51  | 109                              | 2.42  | 78                   | 2.79  | 122        | 2.79  |
| Cameroon              | 95       | 73          | 129         | 2.60      | 2.38        | 2.81        | 49.8                   | 90      | 2.46  | 76             | 2.57  | 63                      | 2.87  | 87                               | 2.60  | 118                  | 2.47  | 142        | 2.57  |
| Mali                  | 96       | 63          | 136         | 2.59      | 2.30        | 2.88        | 49.7                   | 133     | 2.15  | 109            | 2.30  | 88                      | 2.70  | 107                              | 2.45  | 54                   | 3.08  | 119        | 2.83  |
| Malawi                | 97       | 61          | 138         | 2.59      | 2.28        | 2.89        | 49.5                   | 94      | 2.43  | 126            | 2.18  | 105                     | 2.55  | 82                               | 2.68  | 94                   | 2.67  | 102        | 2.97  |
| Cambodia              | 98       | 75          | 129         | 2.58      | 2.38        | 2.78        | 49.3                   | 109     | 2.37  | 130            | 2.14  | 71                      | 2.79  | 111                              | 2.41  | 111                  | 2.52  | 84         | 3.16  |
| Uzbekistan            | 99       | 75          | 129         | 2.58      | 2.38        | 2.77        | 49.3                   | 140     | 2.10  | 77             | 2.57  | 120                     | 2.42  | 88                               | 2.59  | 90                   | 2.71  | 91         | 3.09  |
| Bangladesh            | 100      | 68          | 134         | 2.58      | 2.34        | 2.82        | 49.2                   | 121     | 2.30  | 100            | 2.39  | 104                     | 2.56  | 102                              | 2.48  | 79                   | 2.79  | 107        | 2.92  |
| El Salvador           | 101      | 82          | 118         | 2.58      | 2.45        | 2.70        | 49.2                   | 120     | 2.30  | 114            | 2.25  | 86                      | 2.71  | 91                               | 2.56  | 117                  | 2.47  | 90         | 3.10  |
| Uganda                | 102      | 73          | 133         | 2.58      | 2.34        | 2.81        | 49.2                   | 76      | 2.61  | 124            | 2.19  | 78                      | 2.76  | 99                               | 2.50  | 123                  | 2.41  | 110        | 2.90  |
| Belarus               | 103      | 78          | 125         | 2.57      | 2.41        | 2.74        | 49.2                   | 112     | 2.35  | 92             | 2.44  | 134                     | 2.31  | 85                               | 2.64  | 109                  | 2.54  | 78         | 3.18  |
| Solomon Islands       | 104      | 60          | 143         | 2.57      | 2.23        | 2.91        | 49.1                   | 52      | 2.77  | 120            | 2.21  | 142                     | 2.20  | 73                               | 2.73  | 126                  | 2.37  | 87         | 3.12  |
| Tunisia               | 105      | 75          | 129         | 2.57      | 2.38        | 2.76        | 49.0                   | 107     | 2.38  | 133            | 2.10  | 115                     | 2.50  | 123                              | 2.30  | 71                   | 2.86  | 70         | 3.24  |
| Ghana                 | 106      | 65          | 138         | 2.57      | 2.29        | 2.85        | 48.9                   | 92      | 2.45  | 90             | 2.44  | 109                     | 2.53  | 95                               | 2.51  | 106                  | 2.57  | 115        | 2.87  |
| Comoros               | 107      | 60          | 144         | 2.56      | 2.20        | 2.91        | 48.6                   | 72      | 2.63  | 113            | 2.25  | 116                     | 2.49  | 138                              | 2.21  | 68                   | 2.93  | 120        | 2.80  |
| Kyrgyz Republic       | 108      | 73          | 138         | 2.55      | 2.29        | 2.80        | 48.3                   | 55      | 2.75  | 103            | 2.38  | 138                     | 2.22  | 114                              | 2.36  | 99                   | 2.64  | 106        | 2.94  |
| Morocco               | 109      | 79          | 133         | 2.54      | 2.35        | 2.73        | 48.1                   | 115     | 2.33  | 93             | 2.43  | 103                     | 2.58  | 101                              | 2.49  | 112                  | 2.51  | 114        | 2.88  |
| Nigeria               | 110      | 64          | 144         | 2.53      | 2.21        | 2.86        | 47.9                   | 147     | 1.97  | 78             | 2.56  | 110                     | 2.52  | 112                              | 2.40  | 92                   | 2.68  | 92         | 3.07  |
| Zambia                | 111      | 84          | 130         | 2.53      | 2.36        | 2.69        | 47.7                   | 129     | 2.18  | 108            | 2.30  | 54                      | 3.05  | 103                              | 2.48  | 158                  | 1.98  | 94         | 3.05  |
| Bahamas, The          | 112      | 85          | 130         | 2.53      | 2.37        | 2.69        | 47.6                   | 61      | 2.68  | 98             | 2.41  | 114                     | 2.50  | 130                              | 2.27  | 110                  | 2.52  | 125        | 2.75  |
| Jamaica               | 113      | 79          | 135         | 2.52      | 2.32        | 2.72        | 47.4                   | 99      | 2.42  | 107            | 2.32  | 107                     | 2.53  | 94                               | 2.54  | 116                  | 2.48  | 121        | 2.79  |
| Nepal                 | 114      | 77          | 138         | 2.51      | 2.28        | 2.75        | 47.3                   | 122     | 2.29  | 123            | 2.19  | 129                     | 2.36  | 105                              | 2.46  | 98                   | 2.65  | 89         | 3.10  |
| Congo, Rep.           | 115      | 65          | 151         | 2.49      | 2.12        | 2.85        | 46.4                   | 123     | 2.27  | 138            | 2.07  | 64                      | 2.87  | 127                              | 2.28  | 125                  | 2.38  | 103        | 2.95  |
| Moldova               | 116      | 92          | 137         | 2.46      | 2.30        | 2.62        | 45.5                   | 124     | 2.25  | 141            | 2.02  | 90                      | 2.69  | 122                              | 2.30  | 142                  | 2.21  | 82         | 3.17  |
| Algeria               | 117      | 85          | 143         | 2.45      | 2.21        | 2.69        | 45.2                   | 138     | 2.13  | 96             | 2.42  | 122                     | 2.39  | 113                              | 2.39  | 103                  | 2.60  | 124        | 2.76  |
| Togo                  | 118      | 78          | 150         | 2.45      | 2.16        | 2.74        | 45.2                   | 119     | 2.31  | 116            | 2.23  | 111                     | 2.52  | 134                              | 2.25  | 120                  | 2.45  | 112        | 2.88  |
| Georgia               | 119      | 84          | 146         | 2.44      | 2.19        | 2.69        | 45.1                   | 95      | 2.42  | 102            | 2.38  | 124                     | 2.38  | 132                              | 2.26  | 139                  | 2.26  | 105        | 2.95  |
| Congo, Dem. Rep.      | 120      | 104         | 138         | 2.43      | 2.28        | 2.57        | 44.6                   | 108     | 2.37  | 132            | 2.12  | 127                     | 2.37  | 100                              | 2.49  | 114                  | 2.51  | 133        | 2.69  |
| Sudan                 | 121      | 91          | 141         | 2.43      | 2.23        | 2.62        | 44.6                   | 136     | 2.14  | 125            | 2.18  | 102                     | 2.58  | 96                               | 2.51  | 115                  | 2.51  | 139        | 2.62  |
| Pakistan              | 122      | 98          | 140         | 2.42      | 2.26        | 2.58        | 44.3                   | 139     | 2.12  | 121            | 2.20  | 97                      | 2.63  | 89                               | 2.59  | 136                  | 2.27  | 136        | 2.66  |
| Chad                  | 123      | 75          | 156         | 2.42      | 2.07        | 2.76        | 44.3                   | 134     | 2.15  | 104            | 2.37  | 125                     | 2.37  | 86                               | 2.62  | 127                  | 2.37  | 138        | 2.62  |
| Trinidad and Tobago   | 124      | 93          | 143         | 2.42      | 2.22        | 2.61        | 44.2                   | 96      | 2.42  | 101            | 2.38  | 101                     | 2.59  | 129                              | 2.27  | 135                  | 2.27  | 144        | 2.53  |
| Guatemala             | 125      | 93          | 143         | 2.41      | 2.22        | 2.61        | 44.2                   | 132     | 2.16  | 122            | 2.20  | 130                     | 2.33  | 136                              | 2.25  | 122                  | 2.42  | 88         | 3.11  |
| Turkmenistan          | 126      | 97          | 141         | 2.41      | 2.23        | 2.59        | 44.0                   | 111     | 2.35  | 117            | 2.23  | 136                     | 2.29  | 120                              | 2.31  | 107                  | 2.56  | 130        | 2.72  |
| Gambia, The           | 127      | 84          | 153         | 2.40      | 2.11        | 2.69        | 43.8                   | 141     | 2.08  | 155            | 1.82  | 87                      | 2.71  | 142                              | 2.21  | 73                   | 2.81  | 131        | 2.71  |
| Madagascar            | 128      | 97          | 146         | 2.39      | 2.19        | 2.59        | 43.4                   | 118     | 2.32  | 128            | 2.16  | 146                     | 2.19  | 118                              | 2.33  | 102                  | 2.61  | 128        | 2.73  |

| Economy                  | LPI rank |             |             | LPI score |             |             | % of highest performer | Customs |       | Infrastructure |       | International shipments |       | Logistics quality and competence |       | Tracking and tracing |       | Timeliness |       |
|--------------------------|----------|-------------|-------------|-----------|-------------|-------------|------------------------|---------|-------|----------------|-------|-------------------------|-------|----------------------------------|-------|----------------------|-------|------------|-------|
|                          | Rank     | Lower bound | Upper bound | Score     | Lower bound | Upper bound |                        | Rank    | Score | Rank           | Score | Rank                    | Score | Rank                             | Score | Rank                 | Score | Rank       | Score |
|                          |          |             |             |           |             |             |                        |         |       |                |       |                         |       |                                  |       |                      |       |            |       |
| Guinea-Bissau            | 129      | 86          | 153         | 2.39      | 2.11        | 2.67        | 43.3                   | 144     | 2.01  | 159            | 1.78  | 108                     | 2.53  | 126                              | 2.28  | 80                   | 2.78  | 116        | 2.86  |
| Mongolia                 | 130      | 100         | 148         | 2.37      | 2.17        | 2.58        | 42.9                   | 127     | 2.22  | 135            | 2.10  | 117                     | 2.49  | 140                              | 2.21  | 152                  | 2.10  | 93         | 3.06  |
| Bolivia                  | 131      | 113         | 146         | 2.36      | 2.19        | 2.52        | 42.4                   | 117     | 2.32  | 129            | 2.15  | 106                     | 2.54  | 139                              | 2.21  | 148                  | 2.13  | 127        | 2.74  |
| Guyana                   | 132      | 114         | 145         | 2.36      | 2.20        | 2.52        | 42.4                   | 84      | 2.55  | 137            | 2.09  | 148                     | 2.17  | 137                              | 2.24  | 121                  | 2.44  | 137        | 2.65  |
| Fiji                     | 133      | 94          | 154         | 2.35      | 2.10        | 2.60        | 42.2                   | 101     | 2.41  | 99             | 2.40  | 149                     | 2.16  | 119                              | 2.31  | 132                  | 2.31  | 143        | 2.54  |
| Tajikistan               | 134      | 108         | 151         | 2.34      | 2.12        | 2.56        | 41.8                   | 150     | 1.92  | 127            | 2.17  | 133                     | 2.31  | 116                              | 2.33  | 131                  | 2.33  | 104        | 2.95  |
| Mauritania               | 135      | 108         | 153         | 2.33      | 2.11        | 2.55        | 41.6                   | 128     | 2.20  | 112            | 2.26  | 145                     | 2.19  | 144                              | 2.19  | 119                  | 2.47  | 134        | 2.68  |
| Equatorial Guinea        | 136      | 82          | 160         | 2.32      | 1.93        | 2.70        | 41.2                   | 151     | 1.91  | 151            | 1.88  | 62                      | 2.88  | 133                              | 2.25  | 149                  | 2.13  | 126        | 2.75  |
| Myanmar                  | 137      | 115         | 154         | 2.30      | 2.10        | 2.50        | 40.5                   | 131     | 2.17  | 143            | 1.99  | 144                     | 2.20  | 128                              | 2.28  | 143                  | 2.20  | 108        | 2.91  |
| Syrian Arab Republic     | 138      | 115         | 155         | 2.30      | 2.08        | 2.51        | 40.5                   | 154     | 1.82  | 82             | 2.51  | 126                     | 2.37  | 124                              | 2.29  | 128                  | 2.37  | 148        | 2.44  |
| Lesotho                  | 139      | 107         | 159         | 2.28      | 1.99        | 2.56        | 39.9                   | 110     | 2.36  | 145            | 1.96  | 140                     | 2.21  | 154                              | 2.03  | 129                  | 2.37  | 132        | 2.70  |
| Yemen, Rep.              | 140      | 80          | 160         | 2.27      | 1.82        | 2.71        | 39.5                   | 104     | 2.40  | 131            | 2.12  | 141                     | 2.21  | 131                              | 2.26  | 146                  | 2.16  | 151        | 2.43  |
| Senegal                  | 141      | 115         | 159         | 2.25      | 2.01        | 2.50        | 39.1                   | 130     | 2.17  | 118            | 2.22  | 128                     | 2.36  | 149                              | 2.11  | 150                  | 2.11  | 145        | 2.52  |
| Venezuela, RB            | 142      | 130         | 156         | 2.23      | 2.08        | 2.38        | 38.4                   | 156     | 1.79  | 134            | 2.10  | 123                     | 2.38  | 141                              | 2.21  | 133                  | 2.29  | 141        | 2.58  |
| Liberia                  | 143      | 115         | 159         | 2.23      | 1.97        | 2.49        | 38.4                   | 152     | 1.91  | 149            | 1.91  | 155                     | 2.08  | 148                              | 2.14  | 155                  | 2.05  | 69         | 3.25  |
| Somalia                  | 144      | 117         | 159         | 2.21      | 1.97        | 2.45        | 37.8                   | 145     | 2.00  | 157            | 1.81  | 100                     | 2.61  | 121                              | 2.30  | 140                  | 2.23  | 157        | 2.20  |
| Guinea                   | 145      | 126         | 159         | 2.20      | 1.99        | 2.41        | 37.5                   | 93      | 2.45  | 160            | 1.56  | 132                     | 2.32  | 152                              | 2.07  | 91                   | 2.70  | 160        | 2.04  |
| Cuba                     | 146      | 128         | 159         | 2.20      | 2.00        | 2.39        | 37.4                   | 143     | 2.03  | 139            | 2.04  | 137                     | 2.27  | 143                              | 2.20  | 147                  | 2.15  | 147        | 2.46  |
| Iraq                     | 147      | 137         | 159         | 2.18      | 2.04        | 2.31        | 36.7                   | 153     | 1.84  | 140            | 2.03  | 131                     | 2.32  | 159                              | 1.91  | 144                  | 2.19  | 129        | 2.72  |
| Papua New Guinea         | 148      | 128         | 159         | 2.17      | 1.95        | 2.40        | 36.7                   | 116     | 2.32  | 144            | 1.97  | 150                     | 2.15  | 160                              | 1.88  | 138                  | 2.26  | 150        | 2.44  |
| Bhutan                   | 149      | 129         | 159         | 2.17      | 1.95        | 2.39        | 36.5                   | 135     | 2.14  | 150            | 1.91  | 160                     | 1.80  | 115                              | 2.35  | 130                  | 2.35  | 146        | 2.49  |
| Gabon                    | 150      | 117         | 160         | 2.16      | 1.87        | 2.45        | 36.3                   | 148     | 1.96  | 136            | 2.09  | 153                     | 2.10  | 151                              | 2.07  | 153                  | 2.07  | 135        | 2.67  |
| Central African Republic | 151      | 116         | 160         | 2.15      | 1.81        | 2.48        | 35.9                   | 126     | 2.24  | 148            | 1.93  | 135                     | 2.30  | 157                              | 1.93  | 151                  | 2.10  | 156        | 2.33  |
| Zimbabwe                 | 152      | 128         | 160         | 2.12      | 1.84        | 2.40        | 35.0                   | 146     | 2.00  | 154            | 1.83  | 156                     | 2.06  | 147                              | 2.16  | 137                  | 2.26  | 152        | 2.39  |
| Haiti                    | 153      | 140         | 159         | 2.11      | 1.95        | 2.27        | 34.7                   | 142     | 2.03  | 147            | 1.94  | 157                     | 2.01  | 145                              | 2.19  | 154                  | 2.05  | 149        | 2.44  |
| Libya                    | 154      | 136         | 160         | 2.11      | 1.89        | 2.32        | 34.6                   | 149     | 1.95  | 115            | 2.25  | 159                     | 1.99  | 153                              | 2.05  | 160                  | 1.64  | 123        | 2.77  |
| Eritrea                  | 155      | 130         | 160         | 2.09      | 1.79        | 2.38        | 34.0                   | 137     | 2.13  | 152            | 1.86  | 154                     | 2.09  | 146                              | 2.17  | 145                  | 2.17  | 159        | 2.08  |
| Sierra Leone             | 156      | 137         | 160         | 2.08      | 1.85        | 2.31        | 33.7                   | 155     | 1.82  | 156            | 1.82  | 147                     | 2.18  | 156                              | 2.00  | 134                  | 2.27  | 154        | 2.34  |
| Niger                    | 157      | 116         | 160         | 2.07      | 1.66        | 2.48        | 33.4                   | 157     | 1.77  | 142            | 2.00  | 158                     | 2.00  | 150                              | 2.10  | 141                  | 2.22  | 155        | 2.33  |
| Burundi                  | 158      | 139         | 160         | 2.06      | 1.85        | 2.28        | 33.2                   | 159     | 1.69  | 146            | 1.95  | 139                     | 2.21  | 117                              | 2.33  | 156                  | 2.01  | 158        | 2.17  |
| Angola                   | 159      | 142         | 160         | 2.05      | 1.85        | 2.25        | 32.7                   | 160     | 1.57  | 153            | 1.86  | 143                     | 2.20  | 155                              | 2.00  | 157                  | 2.00  | 140        | 2.59  |
| Afghanistan              | 160      | 155         | 160         | 1.95      | 1.79        | 2.11        | 29.6                   | 158     | 1.73  | 158            | 1.81  | 152                     | 2.10  | 158                              | 1.92  | 159                  | 1.70  | 153        | 2.38  |

Note: The LPI index is a multidimensional assessment of logistics performance, rated on a scale from 1 (worst) to 5 (best). The six core components captured by the LPI survey are rated by respondents on a scale of 1–5, where 1 is very low or very difficult and 5 is very high or very easy, except for question 15, where 1 is hardly ever and 5 is nearly always. The relative LPI score is obtained by normalizing the LPI score: Percentage of highest performer =  $100 \times [LPI - 1] / [LPI \text{ highest} - 1]$ . Thus, the best performer has the maximum relative LPI score of 100 percent.

Source: Logistics Performance Index 2018.

# 3 Domestic LPI results, by region and income group

Percent of respondents, unless otherwise indicated. Data for regional averages include low- and middle-income countries only.

| Question  | Response categories | Region                |                         |                             |                              |            | Income group       |            |                     |                     |             |
|---|---------------------|-----------------------|-------------------------|-----------------------------|------------------------------|------------|--------------------|------------|---------------------|---------------------|-------------|
|   |                     | East Asia and Pacific | Europe and Central Asia | Latin America and Caribbean | Middle East and North Africa | South Asia | Sub-Saharan Africa | Low income | Lower middle income | Upper middle income | High income |
| <b>Question 17: Level of fees and charges</b>         |                     |                       |                         |                             |                              |            |                    |            |                     |                     |             |
| Port charges  | High or very high   | 35                    | 53                      | 60                          | 47                           | 56         | 65                 | 71         | 63                  | 39                  | 35          |
|   | Low or very low     | 8                     | 6                       | 3                           | 3                            | 8          | 3                  | 2          | 2                   | 9                   | 18          |
| Airport charges                                       | High or very high   | 30                    | 59                      | 54                          | 34                           | 61         | 60                 | 64         | 59                  | 40                  | 35          |
|   | Low or very low     | 11                    | 10                      | 13                          | 27                           | 7          | 10                 | 9          | 6                   | 19                  | 9           |
| Road transport charges                                | High or very high   | 39                    | 31                      | 69                          | 15                           | 63         | 44                 | 51         | 53                  | 36                  | 25          |
|   | Low or very low     | 14                    | 17                      | 11                          | 50                           | 7          | 4                  | 2          | 8                   | 24                  | 31          |
| Rail transport rates                                  | High or very high   | 15                    | 50                      | 29                          | 6                            | 46         | 19                 | 27         | 29                  | 26                  | 31          |
|   | Low or very low     | 28                    | 17                      | 15                          | 71                           | 8          | 21                 | 11         | 30                  | 24                  | 17          |
| Warehousing/transloading service charges              | High or very high   | 26                    | 30                      | 44                          | 25                           | 39         | 32                 | 45         | 37                  | 25                  | 31          |
|   | Low or very low     | 23                    | 20                      | 4                           | 40                           | 14         | 4                  | 2          | 8                   | 23                  | 32          |
| Agent fees  | High or very high   | 17                    | 34                      | 19                          | 20                           | 48         | 9                  | 23         | 22                  | 18                  | 21          |
|   | Low or very low     | 32                    | 23                      | 21                          | 33                           | 24         | 18                 | 18         | 19                  | 29                  | 25          |
| <b>Question 18: Quality of infrastructure</b>         |                     |                       |                         |                             |                              |            |                    |            |                     |                     |             |
| Ports   | Low or very low     | 38                    | 49                      | 54                          | 21                           | 38         | 31                 | 52         | 39                  | 35                  | 15          |
|   | High or very high   | 33                    | 14                      | 26                          | 70                           | 18         | 45                 | 26         | 26                  | 42                  | 66          |
| Airports  | Low or very low     | 22                    | 21                      | 37                          | 10                           | 61         | 35                 | 60         | 31                  | 16                  | 9           |
|   | High or very high   | 36                    | 22                      | 23                          | 53                           | 14         | 39                 | 25         | 22                  | 42                  | 65          |
| Roads   | Low or very low     | 30                    | 43                      | 50                          | 11                           | 75         | 42                 | 62         | 42                  | 33                  | 14          |
|   | High or very high   | 33                    | 21                      | 9                           | 45                           | 7          | 17                 | 13         | 12                  | 30                  | 58          |
| Rail  | Low or very low     | 59                    | 53                      | 68                          | 58                           | 64         | 54                 | 60         | 64                  | 53                  | 37          |
|   | High or very high   | 10                    | 20                      | 0                           | 12                           | 10         | 13                 | 3          | 6                   | 19                  | 34          |
| Warehousing/transloading facilities                   | Low or very low     | 21                    | 19                      | 27                          | 20                           | 55         | 18                 | 38         | 30                  | 10                  | 10          |
|   | High or very high   | 33                    | 23                      | 6                           | 56                           | 7          | 30                 | 14         | 17                  | 37                  | 61          |
| Telecommunications and IT                             | Low or very low     | 31                    | 21                      | 27                          | 15                           | 13         | 21                 | 33         | 27                  | 14                  | 5           |
|   | High or very high   | 43                    | 48                      | 26                          | 69                           | 37         | 47                 | 35         | 36                  | 52                  | 75          |
| <b>Question 19: Quality and competence of service</b> |                     |                       |                         |                             |                              |            |                    |            |                     |                     |             |
| Roads   | Low or very low     | 19                    | 33                      | 27                          | 8                            | 45         | 10                 | 17         | 26                  | 20                  | 8           |
|   | High or very high   | 36                    | 37                      | 21                          | 54                           | 8          | 33                 | 18         | 25                  | 44                  | 74          |
| Rail  | Low or very low     | 50                    | 44                      | 69                          | 46                           | 56         | 38                 | 38         | 58                  | 46                  | 24          |
|   | High or very high   | 11                    | 22                      | 5                           | 16                           | 2          | 26                 | 17         | 13                  | 19                  | 45          |
| Air transport   | Low or very low     | 14                    | 14                      | 11                          | 4                            | 4          | 12                 | 14         | 12                  | 10                  | 6           |
|   | High or very high   | 45                    | 40                      | 41                          | 44                           | 24         | 51                 | 34         | 39                  | 52                  | 74          |
| Maritime transport                                    | Low or very low     | 11                    | 23                      | 9                           | 5                            | 23         | 15                 | 26         | 16                  | 8                   | 6           |
|   | High or very high   | 42                    | 23                      | 47                          | 69                           | 24         | 50                 | 36         | 41                  | 46                  | 71          |
| Warehousing/transloading and distribution             | Low or very low     | 14                    | 25                      | 9                           | 29                           | 39         | 1                  | 5          | 23                  | 10                  | 4           |
|   | High or very high   | 37                    | 29                      | 18                          | 49                           | 12         | 46                 | 32         | 24                  | 42                  | 70          |
| Freight forwarders                                    | Low or very low     | 6                     | 23                      | 8                           | 13                           | 29         | 2                  | 5          | 18                  | 7                   | 6           |
|   | High or very high   | 47                    | 43                      | 22                          | 64                           | 39         | 55                 | 39         | 36                  | 53                  | 79          |
| Customs agencies                                      | Low or very low     | 30                    | 20                      | 31                          | 23                           | 57         | 25                 | 33         | 35                  | 20                  | 12          |
|   | High or very high   | 39                    | 27                      | 15                          | 22                           | 14         | 36                 | 24         | 24                  | 33                  | 72          |

| Question  | Response categories    | Region                |                         |                             |                              |            |                    | Income group |                     |                     |             |
|---|------------------------|-----------------------|-------------------------|-----------------------------|------------------------------|------------|--------------------|--------------|---------------------|---------------------|-------------|
|   |                        | East Asia and Pacific | Europe and Central Asia | Latin America and Caribbean | Middle East and North Africa | South Asia | Sub-Saharan Africa | Low income   | Lower middle income | Upper middle income | High income |
| Quality/standards inspection agencies                               | Low or very low        | 25                    | 26                      | 36                          | 8                            | 63         | 20                 | 35           | 31                  | 21                  | 6           |
|   | High or very high      | 24                    | 25                      | 15                          | 59                           | 12         | 34                 | 20           | 25                  | 31                  | 62          |
| Health/sanitary and phytosanitary agencies                          | Low or very low        | 29                    | 41                      | 60                          | 16                           | 64         | 35                 | 46           | 43                  | 39                  | 10          |
|   | High or very high      | 19                    | 18                      | 4                           | 52                           | 7          | 31                 | 20           | 16                  | 24                  | 61          |
| Customs brokers   | Low or very low        | 11                    | 17                      | 21                          | 6                            | 49         | 13                 | 23           | 24                  | 8                   | 10          |
|   | High or very high      | 50                    | 36                      | 14                          | 56                           | 18         | 28                 | 19           | 28                  | 40                  | 66          |
| Trade and transport associations                                    | Low or very low        | 15                    | 35                      | 41                          | 32                           | 46         | 29                 | 42           | 36                  | 22                  | 15          |
|   | High or very high      | 33                    | 29                      | 13                          | 45                           | 13         | 31                 | 19           | 21                  | 37                  | 58          |
| Consignees or shippers  | Low or very low        | 19                    | 24                      | 7                           | 13                           | 14         | 12                 | 20           | 19                  | 8                   | 10          |
|   | High or very high      | 32                    | 18                      | 9                           | 39                           | 17         | 35                 | 20           | 23                  | 29                  | 52          |
| <b>Question 20: Efficiency of processes</b>                         |                        |                       |                         |                             |                              |            |                    |              |                     |                     |             |
| Clearance and delivery of imports as scheduled                      | Hardly ever or rarely  | 6                     | 13                      | 10                          | 17                           | 14         | 15                 | 21           | 13                  | 7                   | 3           |
|   | Often or nearly always | 62                    | 71                      | 62                          | 49                           | 37         | 45                 | 46           | 48                  | 69                  | 87          |
| Clearance and delivery of exports as scheduled                      | Hardly ever or rarely  | 1                     | 13                      | 7                           | 2                            | 34         | 18                 | 19           | 15                  | 6                   | 1           |
|   | Often or nearly always | 77                    | 67                      | 78                          | 83                           | 53         | 60                 | 58           | 65                  | 78                  | 88          |
| Transparency of customs clearance                                   | Hardly ever or rarely  | 8                     | 22                      | 28                          | 20                           | 55         | 16                 | 33           | 24                  | 14                  | 5           |
|   | Often or nearly always | 57                    | 60                      | 37                          | 70                           | 22         | 60                 | 40           | 48                  | 63                  | 84          |
| Transparency of other border agencies                               | Hardly ever or rarely  | 12                    | 15                      | 26                          | 12                           | 57         | 23                 | 45           | 19                  | 14                  | 5           |
|   | Often or nearly always | 52                    | 53                      | 27                          | 56                           | 21         | 47                 | 30           | 42                  | 51                  | 79          |
| Provision of adequate and timely information on regulatory changes  | Hardly ever or rarely  | 14                    | 27                      | 47                          | 29                           | 44         | 27                 | 39           | 31                  | 26                  | 10          |
|   | Often or nearly always | 61                    | 47                      | 25                          | 69                           | 24         | 39                 | 23           | 45                  | 48                  | 69          |
| Expedited customs clearance for traders with high compliance levels | Hardly ever or rarely  | 10                    | 18                      | 28                          | 23                           | 55         | 23                 | 35           | 26                  | 16                  | 10          |
|   | Often or nearly always | 56                    | 52                      | 28                          | 61                           | 17         | 31                 | 19           | 39                  | 50                  | 73          |
| <b>Question 21: Sources of major delays</b>                         |                        |                       |                         |                             |                              |            |                    |              |                     |                     |             |
| Compulsory warehousing/transloading                                 | Often or nearly always | 13                    | 13                      | 24                          | 18                           | 47         | 30                 | 44           | 25                  | 11                  | 5           |
|   | Hardly ever or rarely  | 37                    | 38                      | 36                          | 39                           | 22         | 44                 | 34           | 28                  | 49                  | 68          |
| Preshipment inspection  | Often or nearly always | 10                    | 17                      | 19                          | 32                           | 39         | 24                 | 30           | 27                  | 11                  | 7           |
|   | Hardly ever or rarely  | 58                    | 51                      | 28                          | 37                           | 20         | 25                 | 21           | 30                  | 49                  | 72          |
| Maritime transshipment  | Often or nearly always | 12                    | 16                      | 13                          | 10                           | 44         | 10                 | 10           | 23                  | 10                  | 7           |
|   | Hardly ever or rarely  | 44                    | 38                      | 41                          | 45                           | 17         | 34                 | 26           | 27                  | 52                  | 51          |
| Criminal activities (such as stolen cargo)                          | Often or nearly always | 4                     | 16                      | 7                           | 1                            | 21         | 5                  | 0            | 14                  | 8                   | 2           |
|   | Hardly ever or rarely  | 68                    | 70                      | 49                          | 75                           | 36         | 74                 | 75           | 53                  | 69                  | 85          |

| Question  | Response categories         | Region                |                         |                             |                              |            |                    | Income group |                     |                     |             |
|---|-----------------------------|-----------------------|-------------------------|-----------------------------|------------------------------|------------|--------------------|--------------|---------------------|---------------------|-------------|
|   |                             | East Asia and Pacific | Europe and Central Asia | Latin America and Caribbean | Middle East and North Africa | South Asia | Sub-Saharan Africa | Low income   | Lower middle income | Upper middle income | High income |
| Solicitation of informal payments   | Often or nearly always      | 13                    | 16                      | 25                          | 11                           | 35         | 29                 | 21           | 33                  | 14                  | 3           |
|   | Hardly ever or rarely       | 45                    | 68                      | 33                          | 68                           | 25         | 34                 | 28           | 33                  | 61                  | 86          |
| <b>Question 22: Changes in the logistics environment since 2015</b>   |                             |                       |                         |                             |                              |            |                    |              |                     |                     |             |
| Customs clearance procedures  | Much worsened or worsened   | 10                    | 8                       | 17                          | 26                           | 20         | 16                 | 14           | 26                  | 5                   | 5           |
|   | Improved or much improved   | 66                    | 51                      | 57                          | 56                           | 46         | 65                 | 56           | 55                  | 64                  | 63          |
| Other official clearance procedures   | Much worsened or worsened   | 10                    | 10                      | 18                          | 18                           | 22         | 9                  | 8            | 21                  | 8                   | 5           |
|   | Improved or much improved   | 55                    | 40                      | 45                          | 52                           | 36         | 57                 | 54           | 47                  | 48                  | 55          |
| Trade and transport infrastructure  | Much worsened or worsened   | 9                     | 12                      | 22                          | 14                           | 26         | 10                 | 10           | 24                  | 7                   | 5           |
|   | Improved or much improved   | 56                    | 56                      | 54                          | 52                           | 29         | 44                 | 29           | 48                  | 60                  | 60          |
| Telecommunications and IT infrastructure  | Much worsened or worsened   | 7                     | 9                       | 14                          | 1                            | 0          | 10                 | 14           | 7                   | 9                   | 1           |
|   | Improved or much improved   | 58                    | 71                      | 50                          | 77                           | 43         | 64                 | 51           | 63                  | 63                  | 72          |
| Private logistics services  | Much worsened or worsened   | 1                     | 9                       | 13                          | 5                            | 24         | 0                  | 0            | 10                  | 7                   | 4           |
|   | Improved or much improved   | 60                    | 64                      | 66                          | 67                           | 42         | 64                 | 51           | 66                  | 65                  | 72          |
| Regulation related to logistics   | Much worsened or worsened   | 7                     | 18                      | 7                           | 23                           | 29         | 9                  | 10           | 17                  | 9                   | 14          |
|   | Improved or much improved   | 52                    | 39                      | 48                          | 47                           | 25         | 47                 | 38           | 41                  | 52                  | 36          |
| Solicitation of informal payments   | Much worsened or worsened   | 6                     | 25                      | 10                          | 16                           | 34         | 26                 | 26           | 21                  | 14                  | 2           |
|   | Improved or much improved   | 38                    | 37                      | 47                          | 50                           | 25         | 45                 | 48           | 32                  | 48                  | 43          |
| <b>Question 23: Developments since 2015</b>   |                             |                       |                         |                             |                              |            |                    |              |                     |                     |             |
| Demand for traditional freight forwarding as a commercial service   | Much decreased or decreased | 13                    | 20                      | 13                          | 30                           | 28         | 14                 | 10           | 13                  | 27                  | 5           |
|   | Increased or much increased | 47                    | 49                      | 51                          | 50                           | 28         | 50                 | 45           | 46                  | 51                  | 46          |
| Increased use of electronic trading platforms (business to business and business to consumer) by shippers mean that business volumes have | Much decreased or decreased | 2                     | 9                       | 7                           | 8                            | 2          | 8                  | 3            | 5                   | 12                  | 0           |
|   | Increased or much increased | 63                    | 46                      | 45                          | 51                           | 28         | 49                 | 60           | 51                  | 47                  | 45          |
| Cybersecurity threats in logistics  | Much decreased or decreased | 18                    | 20                      | 3                           | 23                           | 15         | 17                 | 9            | 9                   | 19                  | 19          |
|   | Increased or much increased | 22                    | 39                      | 40                          | 37                           | 24         | 42                 | 66           | 46                  | 26                  | 36          |
| Firm's preparedness for cyber threats   | Much decreased or decreased | 11                    | 10                      | 3                           | 7                            | 1          | 13                 | 1            | 3                   | 11                  | 16          |
|   | Increased or much increased | 47                    | 50                      | 45                          | 62                           | 30         | 43                 | 78           | 58                  | 43                  | 26          |

| Question  | Response categories                 | Region                |                         |                             |                              |            |                    | Income group |                     |                     |             |
|---|-------------------------------------|-----------------------|-------------------------|-----------------------------|------------------------------|------------|--------------------|--------------|---------------------|---------------------|-------------|
|   |                                     | East Asia and Pacific | Europe and Central Asia | Latin America and Caribbean | Middle East and North Africa | South Asia | Sub-Saharan Africa | Low income   | Lower middle income | Upper middle income | High income |
| <b>Question 24: Export time and distance</b>  |                                     |                       |                         |                             |                              |            |                    |              |                     |                     |             |
| Port or airport supply chain  | Distance (kilometers)               | 508.35                | 461.75                  | 468.04                      | 577.22                       | 112.13     | 618.05             | 150.70       | 612.90              | 458.82              | 353.02      |
|   | Lead time (days)                    | 2.36                  | 4.83                    | 4.72                        | 2.81                         | 3.43       | 9.37               | 2.42         | 4.72                | 4.45                | 10.35       |
| Land supply chain   | Distance (kilometers)               | 893.34                | 1,348.99                | 430.52                      | 699.71                       | 848.13     | 1,377.22           | 593.71       | 1,059.78            | 940.82              | 1,163.99    |
|   | Lead time (days)                    | 6.88                  | 8.00                    | 4.16                        | 4.07                         | 7.71       | 16.22              | 4.33         | 6.71                | 7.44                | 17.80       |
| <b>Question 25: Import time and distance</b>  |                                     |                       |                         |                             |                              |            |                    |              |                     |                     |             |
| Port or airport supply chain  | Distance (kilometers)               | 137.19                | 499.72                  | 147.42                      | 539.87                       | 235.61     | 684.06             | 174.67       | 486.33              | 239.47              | 659.91      |
|   | Lead time (days)                    | 3.47                  | 3.60                    | 5.48                        | 4.54                         | 4.31       | 6.81               | 2.64         | 5.29                | 3.83                | 6.91        |
| Land supply chain   | Distance (kilometers)               | 468.98                | 1,574.14                | 595.27                      | 739.79                       | 566.81     | 955.95             | 624.00       | 1,125.82            | 741.75              | 719.68      |
|   | Lead time (days)                    | 6.56                  | 8.24                    | 5.80                        | 5.03                         | 6.77       | 8.33               | 5.13         | 7.98                | 7.11                | 5.56        |
| <b>Question 26: Percentage of shipments meeting quality criteria</b>                                  |                                     |                       |                         |                             |                              |            |                    |              |                     |                     |             |
|   | % of shipments                      | 83                    | 79                      | 86                          | 76                           | 65         | 68                 | 86           | 81                  | 74                  | 70          |
| <b>Question 27: Number of agencies</b>  |                                     |                       |                         |                             |                              |            |                    |              |                     |                     |             |
|   | Imports                             | 3.31                  | 2.57                    | 3.37                        | 3.56                         | 5.69       | 4.43               | 2.12         | 3.14                | 3.76                | 4.79        |
|   | Exports                             | 3.16                  | 2.89                    | 3.16                        | 2.92                         | 6.05       | 4.21               | 1.93         | 3.03                | 3.57                | 4.76        |
| <b>Question 28: Number of forms</b>   |                                     |                       |                         |                             |                              |            |                    |              |                     |                     |             |
|   | Imports                             | 4.56                  | 3.68                    | 3.38                        | 4.27                         | 5.32       | 4.90               | 2.41         | 3.68                | 4.53                | 5.14        |
|   | Exports                             | 4.17                  | 4.01                    | 3.34                        | 3.23                         | 4.69       | 4.76               | 2.02         | 3.60                | 4.10                | 5.21        |
| <b>Question 29: Clearance time (days)</b>   |                                     |                       |                         |                             |                              |            |                    |              |                     |                     |             |
|   | Without physical inspection         | 1.20                  | 2.75                    | 1.71                        | 1.60                         | 1.58       | 2.89               | 0.73         | 2.36                | 1.88                | 2.34        |
|   | With physical inspection            | 2.57                  | 2.86                    | 3.35                        | 2.95                         | 3.02       | 4.64               | 1.60         | 3.16                | 3.64                | 3.86        |
| <b>Question 31: Physical inspection</b>   |                                     |                       |                         |                             |                              |            |                    |              |                     |                     |             |
|   | % of import shipments               | 22                    | 15                      | 21                          | 43                           | 29         | 34                 | 10           | 21                  | 28                  | 32          |
| <b>Question 32: Multiple inspections</b>  |                                     |                       |                         |                             |                              |            |                    |              |                     |                     |             |
|   | % of shipments physically inspected | 13                    | 9                       | 3                           | 9                            | 6          | 18                 | 5            | 9                   | 12                  | 13          |
| <b>Question 33: Customs</b>   |                                     |                       |                         |                             |                              |            |                    |              |                     |                     |             |
| Can customs declarations be submitted and processed electronically and online?                        | % yes                               | 92                    | 92                      | 75                          | 80                           | 90         | 86                 | 97           | 85                  | 89                  | 82          |
| Does customs code require importer to use a licensed customs broker to clear goods?                   | % yes                               | 78                    | 72                      | 86                          | 82                           | 91         | 88                 | 64           | 78                  | 82                  | 92          |
| Are you or your customer able to choose the location of the final clearance of the goods for imports? | % yes                               | 79                    | 84                      | 95                          | 61                           | 37         | 55                 | 74           | 86                  | 72                  | 45          |
| Can goods be released pending final clearance against an accepted guarantee?                          | % yes                               | 53                    | 57                      | 52                          | 75                           | 58         | 60                 | 69           | 56                  | 67                  | 46          |

Note: Responses are calculated at the country level and then averaged by region and income group.

Source: Logistics Performance Index 2018.

# Domestic LPI results, time and distance data

| Economy              | Question 24: Export time and distance     |                     |                                |                     | Question 25: Import time and distance     |                     |                                |                     |
|----------------------|---|---------------------|--------------------------------|---------------------|---|---------------------|--------------------------------|---------------------|
|                      | Port or airport supply chain <sup>a</sup> |                     | Land supply chain <sup>b</sup> |                     | Port or airport supply chain <sup>c</sup> |                     | Land supply chain <sup>b</sup> |                     |
|                      | Distance <sup>d</sup><br>(kilometers)     | Lead time<br>(days) | Distance<br>(kilometers)       | Lead time<br>(days) | Distance<br>(kilometers)                  | Lead time<br>(days) | Distance<br>(kilometers)       | Lead time<br>(days) |
| Albania              | 300                                       | 10                  |                                |                     | 25  | 14                  |                                |                     |
| Argentina            | 117                                       | 4                   | 265                            | 4                   | 49  | 5                   | 517                            | 8                   |
| Armenia              | 300                                       | 7                   | 300                            | 25                  |   |                     |                                |                     |
| Australia            | 75  | 1                   |                                |                     | 75  | 1                   |                                |                     |
| Austria              | 332                                       | 2                   | 496                            | 3                   | 344                                       | 3                   | 486                            | 3                   |
| Azerbaijan           | 1,025                                     | 3                   | 2,646                          | 7                   | 43  | 2                   | 296                            | 4                   |
| Belarus              | 75  | 2                   | 25                             | 8                   | 43  | 2                   | 1,581                          | 7                   |
| Belgium              | 160                                       | 2                   | 245                            | 3                   | 186                                       | 3                   | 216                            | 3                   |
| Benin                | 75  | 14                  |                                |                     | 75  | 10                  | 75                             | 3                   |
| Bolivia              | 52  | 3                   | 304                            | 6                   | 75  | 6                   | 968                            | 8                   |
| Brazil               | 276                                       | 5                   | 366                            | 5                   | 240                                       | 5                   | 352                            | 5                   |
| Brunei Darussalam    | 25  | 1                   | 25                             | 1                   | 25  | 1                   | 25                             | 1                   |
| Bulgaria             | 438                                       | 2                   | 1,136                          | 3                   | 276                                       | 2                   | 1,256                          | 3                   |
| Burkina Faso         | 750                                       | 5                   |                                |                     | 300                                       | 2                   |                                |                     |
| Burundi              | 25  | 18                  |                                |                     | 750                                       |                     | 750                            | 3                   |
| Cameroon             | 150                                       | 5                   | 2,092                          | 13                  | 474                                       | 6                   | 1,581                          | 11                  |
| Canada               | 161                                       | 4                   | 766                            | 3                   | 188                                       | 5                   |                                |                     |
| Chile                | 300                                       | 3                   |                                |                     | 300                                       | 3                   |                                |                     |
| China                | 337                                       | 2                   | 707                            | 6                   | 328                                       | 6                   | 784                            | 4                   |
| Colombia             | 237                                       | 2                   |                                |                     | 43  | 5                   |                                |                     |
| Congo, Rep.          | 3,500                                     | 18                  |                                |                     |   |                     |                                |                     |
| Côte d'Ivoire        | 36  | 4                   | 1,250                          | 14                  | 36  | 4                   | 306                            | 16                  |
| Czech Republic       | 300                                       | 7                   | 750                            | 3                   | 474                                       | 5                   | 300                            | 3                   |
| Denmark              | 43  | 3                   | 75                             | 2                   | 52  | 3                   | 75                             | 3                   |
| Dominican Republic   |   |                     | 1,250                          | 6                   |   |                     | 2,000                          | 18                  |
| Egypt, Arab Rep.     | 349                                       | 2                   | 792                            | 5                   | 452                                       | 5                   | 554                            | 6                   |
| Estonia              | 75  | 2                   | 968                            | 4                   | 75  | 2                   | 1,250                          | 4                   |
| Ethiopia             | 750                                       | 60                  | 750                            | 25                  | 750                                       | 10                  | 750                            | 14                  |
| Finland              | 230                                       | 2                   | 785                            | 5                   | 172                                       | 3                   | 553                            | 5                   |
| France               | 261                                       | 2                   | 673                            | 3                   | 177                                       | 3                   | 439                            | 3                   |
| Gabon                | 3,500                                     | 25                  |                                |                     | 3,500                                     | 25                  |                                |                     |
| Georgia              | 300                                       | 2                   | 1,225                          | 4                   | 300                                       | 2                   | 775                            | 3                   |
| Germany              | 212                                       | 2                   | 569                            | 2                   | 350                                       | 2                   | 559                            | 3                   |
| Ghana                | 296                                       | 1                   | 1,620                          | 1                   | 296                                       | 1                   | 25                             | 2                   |
| Greece               | 219                                       | 3                   | 841                            | 3                   | 302                                       | 3                   | 783                            | 7                   |
| Guatemala            | 150                                       | 4                   |                                |                     | 300                                       | 5                   |                                |                     |
| Haiti                |   |                     | 25                             | 1                   |   |                     | 25                             | 1                   |
| Hong Kong SAR, China |   |                     | 300                            | 2                   | 750                                       | 2                   | 474                            | 2                   |
| India                | 246                                       | 3                   | 569                            | 6                   | 203                                       | 3                   | 812                            | 8                   |
| Indonesia            | 171                                       | 2                   | 297                            | 3                   | 277                                       | 4                   | 277                            | 4                   |
| Iran, Islamic Rep.   | 1,581                                     | 3                   |                                |                     | 1,250                                     | 5                   |                                |                     |
| Italy                | 269                                       | 3                   | 541                            | 5                   | 210                                       | 4                   | 519                            | 5                   |
| Japan                | 25  | 2                   |                                |                     | 25  | 3                   |                                |                     |

| Economy            | Question 24: Export time and distance     |                  |                                |                  | Question 25: Import time and distance     |                  |                                |                  |
|--------------------|---|------------------|--------------------------------|------------------|---|------------------|--------------------------------|------------------|
|                    | Port or airport supply chain <sup>a</sup> |                  | Land supply chain <sup>b</sup> |                  | Port or airport supply chain <sup>c</sup> |                  | Land supply chain <sup>b</sup> |                  |
|                    | Distance <sup>d</sup> (kilometers)        | Lead time (days) | Distance (kilometers)          | Lead time (days) | Distance (kilometers)                     | Lead time (days) | Distance (kilometers)          | Lead time (days) |
| Kazakhstan         | 2,000                                     | 10               |                                |                  |   |                  | 3,500                          | 18               |
| Kenya              | 298                                       | 4                | 203                            | 3                | 429                                       | 4                | 483                            | 4                |
| Kuwait             | 75  | 2                | 150                            | 2                | 43  | 3                | 75                             | 4                |
| Lao PDR            | 25  | 2                | 750                            | 3                | 25  | 2                | 750                            | 3                |
| Latvia             | 25  | 1                | 2,000                          | 46               | 25  | 1                | 3,500                          | 53               |
| Lithuania          | 150                                       | 2                | 1,581                          | 4                | 43  | 2                | 1,581                          | 4                |
| Luxembourg         | 96  | 2                | 471                            | 3                | 101                                       | 2                | 393                            | 3                |
| Macedonia, FYR     | 300                                       | 1                |                                |                  | 300                                       | 2                |                                |                  |
| Madagascar         | 300                                       | 1                |                                |                  | 75  | 1                |                                |                  |
| Malawi             | 750                                       | 4                | 3,500                          | 88               | 1,250                                     | 14               |                                |                  |
| Malaysia           | 75  | 2                | 75                             | 4                | 43  | 2                | 75                             | 4                |
| Malta              | 25  | 1                |                                |                  | 25  | 1                |                                |                  |
| Mauritius          | 52  | 1                |                                |                  | 66  | 2                |                                |                  |
| Mexico             | 3,500                                     | 5                |                                |                  | 300                                       | 5                |                                |                  |
| Mongolia           |   |                  | 1,250                          | 14               |   |                  | 1,250                          | 14               |
| Morocco            | 159                                       | 2                | 523                            | 2                | 292                                       | 3                | 631                            | 2                |
| Mozambique         | 75  | 3                |                                |                  | 75  | 5                |                                |                  |
| Myanmar            | 88  | 3                | 683                            | 4                | 106                                       | 4                | 579                            | 5                |
| Namibia            | 25  | 3                | 3,500                          | 25               | 300                                       | 4                | 3,500                          | 25               |
| Nepal              | 61  | 1                | 1,486                          | 10               | 133                                       | 2                | 582                            | 5                |
| Netherlands        | 48  | 2                | 265                            | 1                | 99  | 1                | 453                            | 2                |
| Nigeria            | 64  | 3                | 61                             | 6                | 87  | 2                | 426                            | 4                |
| Norway             | 75  | 1                | 75                             | 1                | 75  | 2                |                                |                  |
| Oman               | 198                                       | 2                | 320                            | 3                | 157                                       | 2                | 256                            | 3                |
| Pakistan           | 66  | 4                | 489                            | 7                | 306                                       | 8                | 306                            | 7                |
| Panama             | 75  | 3                | 300                            | 2                | 75  | 2                | 75                             | 2                |
| Papua New Guinea   | 3,500                                     | 2                | 3,500                          | 2                | 75  | 2                | 75                             | 2                |
| Paraguay           | 25  | 3                |                                |                  |   |                  |                                |                  |
| Peru               | 39  | 2                | 512                            | 2                | 84  | 4                | 75                             | 1                |
| Philippines        | 36  | 1                |                                |                  | 25  | 2                |                                |                  |
| Poland             | 75  | 1                | 750                            | 4                | 300                                       | 1                | 750                            | 5                |
| Portugal           | 141                                       | 3                | 1,601                          | 3                | 157                                       | 3                | 1,738                          | 6                |
| Qatar              | 25  | 10               | 25                             | 7                | 75  | 7                |                                |                  |
| Romania            | 203                                       | 2                | 835                            | 3                | 482                                       | 2                | 1,249                          | 4                |
| Russian Federation | 306                                       | 3                | 3,500                          | 3                | 2,646                                     | 5                | 2,092                          | 9                |
| Rwanda             |   |                  | 2,000                          | 6                |   |                  | 2,000                          | 7                |
| Saudi Arabia       | 235                                       | 4                | 940                            | 5                | 232                                       | 5                | 483                            | 7                |
| Senegal            | 296                                       | 1                | 25                             | 1                | 300                                       | 7                |                                |                  |
| Serbia             | 75  | 2                | 909                            | 4                | 300                                       | 2                | 777                            | 4                |
| Singapore          | 30  | 2                | 33                             | 1                | 29  | 2                | 33                             | 2                |
| Slovenia           | 300                                       | 1                | 256                            | 2                | 300                                       | 3                | 474                            | 3                |
| Spain              | 143                                       | 2                | 298                            | 2                | 101                                       | 3                | 326                            | 2                |
| Sri Lanka          | 75  | 6                |                                |                  | 300                                       | 4                |                                |                  |
| Sweden             | 474                                       | 1                | 1,025                          | 1                | 300                                       | 3                | 1,025                          | 5                |
| Switzerland        | 36  | 3                | 750                            | 3                | 52  | 2                | 300                            | 2                |
| Taiwan, China      | 75  | 1                |                                |                  | 75  | 2                |                                |                  |

| Economy              | Question 24: Export time and distance     |                  |                                |                  | Question 25: Import time and distance     |                  |                                |                  |
|----------------------|---|------------------|--------------------------------|------------------|---|------------------|--------------------------------|------------------|
|                      | Port or airport supply chain <sup>a</sup> |                  | Land supply chain <sup>b</sup> |                  | Port or airport supply chain <sup>c</sup> |                  | Land supply chain <sup>b</sup> |                  |
|                      | Distance <sup>d</sup> (kilometers)        | Lead time (days) | Distance (kilometers)          | Lead time (days) | Distance (kilometers)                     | Lead time (days) | Distance (kilometers)          | Lead time (days) |
| Tanzania             | 51  | 4                | 776                            | 7                | 51  | 4                | 326                            | 5                |
| Thailand             | 300                                       | 4                | 300                            | 18               | 300                                       | 5                | 300                            | 18               |
| Tunisia              | 219                                       | 4                | 784                            | 5                | 166                                       | 5                | 1,034                          | 6                |
| Turkey               | 252                                       | 3                | 1,267                          | 6                | 332                                       | 3                | 1,087                          | 6                |
| Uganda               | 750                                       | 3                | 750                            | 5                | 3,500                                     | 14               | 1,250                          | 6                |
| United Arab Emirates | 89  | 2                | 249                            | 2                | 107                                       | 2                | 119                            | 2                |
| United Kingdom       | 147                                       | 2                | 562                            | 4                | 197                                       | 3                | 429                            | 3                |
| United States        | 275                                       | 2                | 612                            | 5                | 263                                       | 2                | 483                            | 4                |
| Uzbekistan           | 429                                       | 16               | 1,647                          | 16               | 750                                       | 3                | 3,129                          | 23               |
| Venezuela, RB        | 209                                       | 15               | 422                            | 7                | 162                                       | 12               | 750                            | 3                |
| Vietnam              | 43  | 2                | 477                            | 9                | 56  | 3                | 131                            | 5                |

a. From the point of origin (the seller's factory, typically located either in the capital city or in the largest commercial center) to the port of loading or equivalent (port/airport), and excluding international shipping (EXW to FOB).

b. From the point of origin (the seller's factory, typically located either in the capital city or in the largest commercial center) to the buyer's warehouse (EXW to DDP).

c. From the port of discharge or equivalent to the buyer's warehouse (DAT to DDP).

d. Aggregates of the distance indicator for port and airport.

Source: Logistics Performance Index 2018.

| Economy              | % of shipments | Question 26:<br>% of shipments meeting quality criteria |         | Question 27:<br>Number of agencies |         | Question 28:<br>Number of forms |         | Without physical inspection | With physical inspection | Question 31:<br>Physical inspection | Question 32:<br>Multiple inspection |
|----------------------|----------------|---|---------|------------------------------------|---------|---------------------------------|---------|-----------------------------|--------------------------|-------------------------------------|-------------------------------------|
|                      |                | Imports   | Exports | Imports                            | Exports | Imports                         | Exports |                             |                          | % of import shipments               | % of shipments physically inspected |
| Afghanistan          |                | 8   | 8       | 8                                  | 6       |                                 |         |                             |                          |                                     |                                     |
| Albania              | 87             | 3   | 4       | 4                                  | 3       | 13                              | 14      | 6                           | 18                       |                                     |                                     |
| Argentina            | 75             | 5   | 4       | 4                                  | 3       | 2                               | 4       | 36                          | 6                        |                                     |                                     |
| Australia            | 93             | 2   | 2       | 1                                  | 1       | 1                               | 2       | 1                           | 1                        | 1                                   |                                     |
| Austria              | 86             | 2   | 2       | 2                                  | 2       | 0                               | 1       | 2                           | 2                        | 2                                   |                                     |
| Azerbaijan           | 61             | 3   | 4       | 5                                  | 8       | 2                               | 2       | 50                          | 6                        |                                     |                                     |
| Belarus              | 57             | 3   | 4       | 4                                  | 4       | 1                               | 1       | 6                           | 1                        |                                     |                                     |
| Belgium              | 82             | 1   | 1       | 2                                  | 2       | 1                               | 1       | 3                           | 1                        |                                     |                                     |
| Benin                | 88             | 3   | 2       | 5                                  | 2       | 5                               | 6       | 18                          | 6                        |                                     |                                     |
| Bolivia              | 83             | 3   | 3       | 2                                  | 3       | 3                               | 7       | 30                          | 1                        |                                     |                                     |
| Brazil               | 82             | 4   | 4       | 5                                  | 4       | 2                               | 5       | 8                           | 5                        |                                     |                                     |
| Brunei Darussalam    | 88             | 1   | 1       | 1                                  | 1       | 0                               | 1       | 6                           | 18                       |                                     |                                     |
| Bulgaria             | 86             | 2   | 2       | 3                                  | 3       | 1                               | 1       | 7                           | 3                        |                                     |                                     |
| Burkina Faso         | 88             | 5   | 5       | 3                                  | 5       | 3                               | 5       | 3                           | 1                        |                                     |                                     |
| Burundi              | 40             | 5   | 3       | 4                                  | 4       | 4                               | 7       | 18                          | 3                        |                                     |                                     |
| Cameroon             | 40             | 5   | 8       | 9                                  | 9       | 2                               | 5       | 37                          | 18                       |                                     |                                     |
| Canada               | 57             | 2   | 2       | 3                                  | 1       | 1                               | 4       | 2                           | 1                        |                                     |                                     |
| Chile                | 93             | 5   | 5       | 5                                  | 5       | 1                               | 1       | 3                           | 1                        |                                     |                                     |
| China                | 81             | 3   | 3       | 4                                  | 4       | 1                               | 2       | 3                           | 1                        |                                     |                                     |
| Colombia             | 96             | 3   | 3       | 5                                  | 3       | 2                               | 2       | 3                           | 1                        |                                     |                                     |
| Côte d'Ivoire        | 51             | 5   | 4       | 6                                  | 4       | 2                               | 6       | 30                          | 6                        |                                     |                                     |
| Czech Republic       | 88             | 1   | 1       | 2                                  | 2       | 1                               | 1       | 1                           | 1                        |                                     |                                     |
| Denmark              | 92             | 1   | 1       | 1                                  | 1       | 1                               | 2       | 1                           | 1                        |                                     |                                     |
| Dominican Republic   | 97             | 2   | 2       | 3                                  | 3       | 1                               | 1       | 50                          | 1                        |                                     |                                     |
| Egypt, Arab Rep.     | 81             | 6   | 5       | 6                                  | 5       | 2                               | 4       | 40                          | 14                       |                                     |                                     |
| Estonia              | 93             | 3   | 3       | 1                                  | 1       | 0                               | 1       | 3                           |                          |                                     |                                     |
| Ethiopia             | 97             | 4   | 6       | 7                                  | 11      | 1                               | 0       | 75                          | 75                       |                                     |                                     |
| Finland              | 93             | 1   | 1       | 2                                  | 1       | 0                               | 1       | 2                           | 1                        |                                     |                                     |
| France               | 79             | 2   | 2       | 2                                  | 2       | 1                               | 1       | 3                           | 2                        |                                     |                                     |
| Gabon                | 83             | 1   | 1       | 6                                  | 5       | 7                               | 7       | 50                          | 50                       |                                     |                                     |
| Georgia              | 62             | 2   | 2       | 2                                  | 2       | 1                               | 1       | 3                           | 1                        |                                     |                                     |
| Germany              | 95             | 1   | 1       | 1                                  | 1       | 1                               | 1       | 2                           | 2                        |                                     |                                     |
| Ghana                | 61             | 1   | 1       | 1                                  | 1       | 7                               | 10      | 35                          | 50                       |                                     |                                     |
| Greece               | 95             | 2   | 2       | 3                                  | 3       | 1                               | 2       | 2                           | 1                        |                                     |                                     |
| Guatemala            | 87             | 4   | 3       | 4                                  | 4       | 1                               | 1       | 42                          | 3                        |                                     |                                     |
| Haiti                | 100            | 1   | 1       | 1                                  | 2       | 1                               | 3       | 1                           | 1                        |                                     |                                     |
| Hong Kong SAR, China | 95             | 3   | 3       | 4                                  | 3       | 1                               | 2       | 75                          | 1                        |                                     |                                     |
| India                | 77             | 3   | 3       | 3                                  | 3       | 1                               | 2       | 19                          | 3                        |                                     |                                     |
| Indonesia            | 73             | 4   | 3       | 5                                  | 3       | 1                               | 7       | 8                           | 2                        |                                     |                                     |
| Iran, Islamic Rep.   | 69             | 3   | 2       | 4                                  | 2       | 1                               | 3       | 75                          | 7                        |                                     |                                     |
| Italy                | 90             | 2   | 2       | 3                                  | 2       | 1                               | 2       | 3                           | 2                        |                                     |                                     |
| Japan                | 93             | 3   | 2       | 1                                  | 1       | 1                               | 1       | 1                           | 1                        |                                     |                                     |
| Kazakhstan           | 93             | 4   | 6       | 5                                  | 8       | 10                              | 5       | 18                          | 50                       |                                     |                                     |
| Kenya                | 53             | 6   | 4       | 6                                  | 4       | 3                               | 4       | 66                          | 39                       |                                     |                                     |
| Kuwait               | 62             | 4   | 3       | 9                                  | 3       | 2                               | 1       | 75                          | 4                        |                                     |                                     |
| Lao PDR              | 93             | 3   | 3       | 4                                  | 4       | 2                               | 3       | 18                          | 1                        |                                     |                                     |

| <b>Economy</b>     | <b>Question 26:<br/>% of shipments<br/>meeting quality<br/>criteria</b> | <b>Question 27:<br/>Number of agencies</b> |                | <b>Question 28:<br/>Number of forms</b> |                | <b>Question 29:<br/>Clearance time (days)<sup>a</sup></b> |   | <b>Question 31:<br/>Physical<br/>inspection</b> | <b>Question 32:<br/>Multiple<br/>inspection</b>    |
|--------------------|---|--|----------------|---|----------------|---|---|---|--|
|                    |   | <b>Imports</b>                             | <b>Exports</b> | <b>Imports</b>                          | <b>Exports</b> | <b>Without<br/>physical<br/>inspection</b>                | <b>With<br/>physical<br/>inspection</b> | <b>% of<br/>import<br/>shipments</b>            | <b>% of shipments<br/>physically<br/>inspected</b> |
| Latvia             | 89  | 3  | 2              | 2                                       | 2              | 0   | 1                                       | 4   | 11   |
| Lithuania          | 97  | 3  | 3              | 2                                       | 2              | 0   | 1                                       | 6   | 2  |
| Luxembourg         | 89  | 2  | 2              | 2                                       | 2              | 1   | 1                                       | 3   | 2  |
| Macedonia, FYR     | 93  | 1  | 1              | 4                                       | 3              | 1   | 1                                       | 35  | 6  |
| Madagascar         | 40  | 11   | 11             | 11                                      | 11             | 2   | 4                                       | 6   | 3  |
| Malawi             | 40  | 3  | 2              | 5                                       | 6              | 6   | 10                                      | 75  | 1  |
| Malaysia           | 69  | 2  | 2              | 2                                       | 2              | 0   | 1                                       | 4   | 1  |
| Malta              | 93  | 1  | 1              | 1                                       | 1              | 1   | 1                                       | 3   | 1  |
| Mauritius          | 66  | 8  | 5              | 4                                       | 2              | 1   | 3                                       | 16  | 3  |
| Mexico             | 93  | 2  | 2              | 2                                       | 2              | 1   | 2                                       | 6   | 1  |
| Mongolia           | 88  | 2  |                | 11                                      | 11             | 1   | 1                                       | 75  | 75   |
| Morocco            | 82  | 3  | 3              | 3                                       | 3              | 1   | 2                                       | 13  | 5  |
| Mozambique         | 88  | 2  | 2              | 3                                       | 3              | 1   | 2                                       | 35  | 3  |
| Myanmar            | 66  | 4  | 4              | 6                                       | 6              | 2   | 3                                       | 28  | 6  |
| Namibia            | 90  | 3  | 3              | 2                                       | 3              | 2   | 4                                       | 11  | 1  |
| Nepal              | 59  | 9  | 9              | 9                                       | 8              | 1   | 1                                       | 75  | 10   |
| Netherlands        | 82  | 2  | 1              | 1                                       | 1              | 0   | 0                                       | 2   | 1  |
| Nigeria            | 93  | 6  | 6              | 6                                       | 6              | 2   | 3                                       | 56  | 21   |
| Norway             | 93  | 1  | 1              | 2                                       | 2              | 1   | 2                                       | 1   | 1  |
| Oman               | 67  | 4  | 3              | 3                                       | 2              | 1   | 2                                       | 36  | 4  |
| Pakistan           | 83  | 4  | 4              | 2                                       | 2              | 2   | 5                                       | 17  | 4  |
| Panama             | 93  | 3  | 3              | 3                                       | 3              | 1   | 1                                       | 6   | 3  |
| Papua New Guinea   | 97  | 5  | 5              | 2                                       | 2              | 1   | 3                                       | 6   | 3  |
| Paraguay           |   | 3  | 3              | 4                                       | 4              | 3   | 3                                       | 1   | 1  |
| Peru               | 88  | 5  | 5              | 3                                       | 3              | 2   | 4                                       | 15  | 4  |
| Philippines        | 87  | 4  | 4              | 6                                       | 6              | 2   | 2                                       | 30  | 1  |
| Poland             | 73  | 2  | 1              | 3                                       | 3              | 1   | 2                                       | 3   | 1  |
| Portugal           | 82  | 3  | 2              | 3                                       | 3              | 1   | 2                                       | 6   | 2  |
| Qatar              |   | 1  | 2              | 3                                       | 3              | 2   | 7                                       | 75  | 75   |
| Romania            | 86  | 2  | 2              | 4                                       | 5              | 1   | 2                                       | 8   | 5  |
| Russian Federation | 69  | 3  | 3              | 2                                       | 2              | 2   | 4                                       | 22  | 4  |
| Rwanda             | 85  | 3  | 2              | 3                                       | 3              | 2   | 2                                       | 4   | 3  |
| Saudi Arabia       | 69  | 3  | 3              | 3                                       | 3              | 2   | 3                                       | 25  | 9  |
| Senegal            | 59  | 3  | 5              | 4                                       | 3              | 1   | 2                                       | 35  | 18   |
| Serbia             | 95  | 3  | 3              | 3                                       | 3              | 1   | 1                                       | 8   | 5  |
| Singapore          | 94  | 2  | 2              | 1                                       | 1              | 0   | 1                                       | 2   | 2  |
| Slovenia           | 96  | 3  | 3              | 2                                       | 2              | 0   | 1                                       | 4   | 2  |
| Spain              | 75  | 2  | 2              | 2                                       | 2              | 1   | 2                                       | 4   | 2  |
| Sri Lanka          | 40  | 4  |                | 4                                       | 4              | 2   | 4                                       | 6   | 6  |
| Sweden             | 97  | 2  | 2              | 3                                       | 3              | 1   | 2                                       | 2   | 1  |
| Switzerland        | 91  | 1  | 1              | 2                                       | 2              | 0   | 1                                       | 3   | 1  |
| Taiwan, China      | 83  | 2  | 2              | 3                                       | 3              | 1   | 1                                       | 1   | 1  |
| Tanzania           | 75  | 7  | 7              | 6                                       | 6              | 2   | 3                                       | 70  | 10   |
| Thailand           | 93  | 3  | 3              | 2                                       | 2              | 1   | 1                                       | 35  | 35   |
| Tunisia            | 74  | 3  | 3              | 5                                       | 3              | 2   | 3                                       | 45  | 10   |
| Turkey             | 77  | 3  | 3              | 4                                       | 4              | 1   | 2                                       | 12  | 6  |

| <b>Economy</b>       | <b>Question 26:<br/>% of shipments<br/>meeting quality<br/>criteria</b> | <b>Question 27:<br/>Number of agencies</b> |                | <b>Question 28:<br/>Number of forms</b> |                | <b>Question 29:<br/>Clearance time (days)<sup>a</sup></b> |   | <b>Question 31:<br/>Physical<br/>inspection</b> | <b>Question 32:<br/>Multiple<br/>inspection</b>    |
|----------------------|---|--|----------------|---|----------------|---|---|---|--|
|                      |   | <b>Imports</b>                             | <b>Exports</b> | <b>Imports</b>                          | <b>Exports</b> | <b>Without<br/>physical<br/>inspection</b>                | <b>With<br/>physical<br/>inspection</b> | <b>% of<br/>import<br/>shipments</b>            | <b>% of shipments<br/>physically<br/>inspected</b> |
| Uganda               | 59  | 3  | 4              | 3                                       | 3              | 3   | 5                                       | 6   | 35   |
| United Arab Emirates | 86  | 3  | 2              | 4                                       | 3              | 1   | 1                                       | 10  | 3  |
| United Kingdom       | 90  | 2  | 1              | 2                                       | 2              | 1   | 2                                       | 2   | 1  |
| United States        | 91  | 3  | 2              | 4                                       | 3              | 2   | 3                                       | 3   | 1  |
| Uzbekistan           | 78  | 3  | 3              | 4                                       | 4              | 1   | 1                                       | 1   | 1  |
| Venezuela, RB        | 50  | 6  | 7              | 6                                       | 7              | 3   | 6                                       | 50  | 7  |
| Vietnam              | 83  | 3  | 2              | 3                                       | 2              | 1   | 3                                       | 10  | 3  |

a. Time taken between the submission of an accepted customs declaration and notification of clearance.

Source: Logistics Performance Index 2018.

# 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 and service quality, predictability, and reliability—cannot be assessed using only time and cost information.

## Constructing the international LPI

The first part of the LPI survey (questions 10–15) provides the raw data for 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 (table A5.1).

**Table A5.1 Methodology for selecting country groups for survey respondents**

|  | Respondents from low-income countries   | Respondents from middle-income countries  | Respondents from high-income countries  |
|--|---|---|---|
| <b>Respondents from coastal countries</b>    | <p>Five most important export partner countries<br/>+<br/>Three most important import partner countries</p>                                   | <p>Three most important export partner countries<br/>+<br/>The most important import partner country<br/>+<br/>Four countries randomly, one from each country group:<br/>a. Africa<br/>b. East Asia and Central Asia<br/>c. Latin America<br/>d. Europe less Central Asia and OECD</p>                            | <p>Two countries randomly from a list of five most important export partner countries and five most important import partner countries<br/>+<br/>Four countries randomly, one from each country group:<br/>a. Africa<br/>b. East Asia and Central Asia<br/>c. Latin America<br/>d. Europe less Central Asia and OECD<br/>+<br/>Two countries randomly from the combined country groups a, b, c, and d</p> |
| <b>Respondents from landlocked countries</b> | <p>Four most important export partner countries<br/>+<br/>Two most important import partner countries<br/>+<br/>Two land-bridge countries</p> | <p>Three most important export partner countries<br/>+<br/>The most important import partner country<br/>+<br/>Two land-bridge countries<br/>+<br/>Two countries randomly, one from each country group:<br/>a. Africa, East Asia and Central Asia, and Latin America<br/>b. Europe less Central Asia and OECD</p> |   |

Source: Authors.

Respondents take the survey online. For the 2018 edition, the survey was open between September 2017 and February 2018. The web engine for 2018 was the same as the new engine put in place in 2012. It incorporates the Uniform Sampling Randomized (USR) approach to gain the most possible responses from underrepresented countries. Because the survey engine relies heavily on a specialized country selection methodology for survey respondents based on high trade volume between countries, the USR can help countries with lower trade volumes rise to the top during country selection.

The 2017–18 survey engine builds a set of countries for the survey respondents that are subject to the rule set (see table A5.1). After 200 surveys, the USR is introduced into the engine’s process for country selection. For each new survey respondent, the USR solicits a response from a country chosen at random but with non-uniform probability—with weights chosen to evolve the sampling toward uniform probability. Specifically, a country  $i$  is chosen with a probability  $(N - n_i) / 2N$ , where  $n_i$  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) in survey question 10.
- *The quality of trade and transport infrastructure*, rated from “very low” (1) to “very high” (5) in survey question 11.
- *The ease of arranging competitively priced shipments*, rated from “very difficult” (1) to “very easy” (5) in survey question 12.
- *The competence and quality of logistics services*, rated from “very low” (1) to “very high” (5) in survey question 13.
- *The ability to track and trace consignments*, rated from “very low” (1) to “very high” (5) in survey question 14.
- *The frequency with which shipments reach consignees within scheduled or expected delivery times*, rated from “hardly ever” (1) to “nearly always” (5) in survey question 15.

The LPI is constructed from these six indicators using principal component analysis (PCA), a standard statistical technique used to reduce the dimensionality of a dataset. In the LPI, the inputs for PCA are country scores on questions 10–15, averaged across all respondents providing data on a given overseas market. Scores are normalized by subtracting the sample mean and dividing by the standard deviation before conducting PCA. The output from PCA is a single indicator—the LPI—that is a weighted average of those scores. The weights are chosen to maximize the percentage of variation in the LPI’s original six indicators that is accounted for by the summary indicator.

Full details of the PCA procedure are in tables A5.2 and A5.3. The first line of table A5.2

**Table A5.2 Results of principal component analysis for the International LPI 2018**

| Component | Eigenvalue | Difference | Proportion | Cumulative |
|-----------|------------|------------|------------|------------|
| 1         | 5.53535    | 5.36359    | 0.9226     | 0.9226     |
| 2         | 0.17175    | 0.0648739  | 0.0286     | 0.9512     |
| 3         | 0.106876   | 0.0292183  | 0.0178     | 0.9690     |
| 4         | 0.0776582  | 0.00796402 | 0.0129     | 0.9819     |
| 5         | 0.0696941  | 0.0310184  | 0.0116     | 0.9936     |
| 6         | 0.0386757  | na         | 0.0064     | 1.0000     |

Source: World Bank staff analysis.

**Table A5.3 Component loadings for the International LPI 2018**

| Component                        | Weight |
|----------------------------------|--------|
| Customs                          | 0.4072 |
| Infrastructure                   | 0.4130 |
| International shipments          | 0.3961 |
| Logistics quality and competence | 0.4166 |
| Tracking and tracing             | 0.4106 |
| Timeliness                       | 0.4056 |

Source: World Bank staff analysis.

shows that the first (principal) eigenvalue of the correlation matrix of the six core indicators is greater than one—and much larger than any other eigenvalue. Standard statistical tests, such as the Kaiser Criterion and the eigenvalue scree plot, suggest that a single principal component be retained to summarize the underlying data. This principal component is the international LPI. Table A5.2 shows that the international LPI accounts for 92 percent of the variation in the six components.

To construct the international LPI, normalized scores for each of the six original indicators are multiplied by their component loadings (table A5.3) 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. Although PCA is re-run for each version of the LPI, the weights remain very steady from year to year. There is thus a high degree of comparability across the various LPI editions.

### **Constructing the confidence intervals**

To account for the sampling error created by the LPI’s survey-based methodology, LPI scores are presented with approximate 80 percent confidence intervals. These intervals make it possible to provide upper and lower bounds for a country’s LPI score and rank. To determine whether a change in score or a difference between two scores is statistically significant, confidence intervals must be examined carefully. For example, a statistically significant improvement in a country’s performance should not be concluded unless the lower bound of the country’s 2018 LPI score exceeds the upper bound of its 2016 score.

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

$$LPI \pm \frac{t_{(0.1, N-1)} S}{\sqrt{N}},$$

where  $LPI$  is a country’s LPI score,  $N$  is the number of survey respondents for that country,

$s$  is the estimated standard error of each country’s LPI score, and  $t$  is Student’s  $t$ -distribution. As a result of this approach, confidence intervals and low-high ranges for scores and ranks are larger for small markets with few respondents, since these estimates are less certain.

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 average confidence interval on the 1–5 scale is 0.2, or about 7 percent of the average country’s LPI score. Because of the bunching of LPI scores in the middle of the distribution, the confidence interval translates into an average of 16 rank places, using upper and lower rank bounds as calculated above. Caution must be taken when interpreting small differences in LPI scores and rankings.

Despite being the most comprehensive data source for country logistics and trade facilitation, the LPI has two important limitations. First, the experience of international freight forwarders might not represent the broader logistics environment in poor countries, which often rely on traditional operators. And the international and traditional operators might differ in their interactions with government agencies—and in their service levels. Second, for landlocked countries and small-island states, the LPI might reflect access problems outside the country assessed, such as transit difficulties. The low rating of a landlocked country might not adequately reflect its trade facilitation efforts, which depend on the workings of complex international transit systems. Landlocked countries cannot eliminate transit inefficiencies with domestic reforms.

### **Constructing the domestic LPI database**

The second part of the LPI survey instrument is the domestic LPI, in which respondents provide

qualitative and quantitative information on the logistics environment in the country where they work.

Questions 17–22 ask respondents to choose one of five performance categories. In question 17, for example, they can describe port charges in their country as “very high,” “high,” “average,” “low,” or “very low.” As in the international LPI, these options are coded from 1 (worst) to 5 (best). Appendix 3 displays country averages of the percentage of respondents rating each aspect of the logistics environment as 1–2 or 4–5. Question 23 referred to the use of electronic platforms in logistics and to cyberthreats.

With a few exceptions, questions 24–35 ask respondents for quantitative information on their countries’ international supply chains,

offering choices in a dropdown menu. When a response indicates a single value, the answer is coded as the logarithm of that value. When a response indicates a range, the answer is coded as the logarithm of the midpoint of that range. For example, export distance can be indicated as less than 50 kilometers, 50–100 kilometers, 100–500 kilometers, and so forth—so a response of 50–100 kilometers is coded as  $\log(75)$ . Full details of the coding matrix are available on request.

Country scores are produced by exponentiating the average of responses in logarithms across all respondents for a given country. This method is equivalent to taking a geometric average in levels. Scores for regions, income groups, and LPI quintiles are simple averages of the relevant country scores.

**APPENDIX**

# 6

## Respondent demographics

Operators on the ground are best placed to assess the vital aspects of logistics performance. The LPI thus uses a structured online survey of logistics professionals at multinational freight forwarders and at the main express carriers. The 2018 LPI data are based on a survey conducted between September 2017 and February 2018, answered by 869 respondents at international logistics companies in 108 countries.

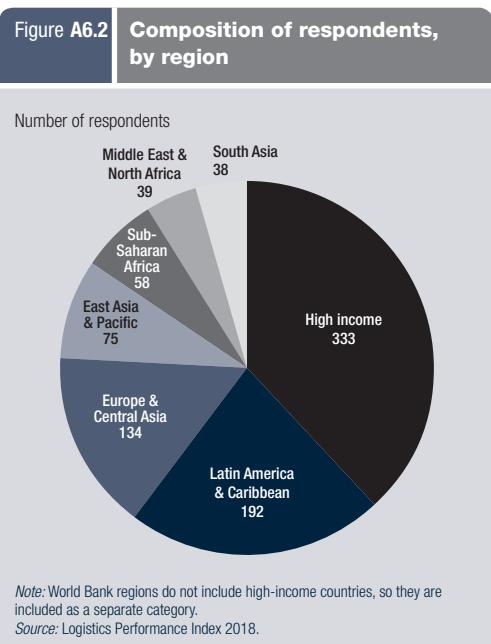
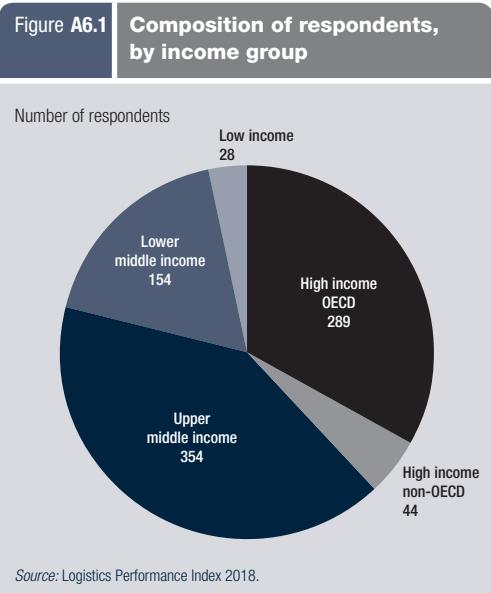
### Geographic dispersion of respondents

Among the respondents, 62 percent are in either low income countries (3 percent) or middle-income countries (59 percent). The overall number is similar to the 2016 LPI, but this year there are relatively many more contributions from upper-middle-income countries. The lack of representation of low income countries is due to their more marginal role in world trade, and the difficulty of communicating effectively with operators on the ground (figure A6.1).

Among developing countries, all regions are well represented, especially Latin America and Caribbean (figure A6.2). Increasing involvement of local associations and operators will hopefully help build response rates in the future in other regions.

### Respondents' positions in their companies

The LPI assesses both large companies and small and medium enterprises. Large companies (those with 250 employees or more) account for around 29 percent of responses, which is higher than in 2016. Most of the responses are thus from small and medium enterprises.



Knowledgeable senior company members are important to the survey. The 2018 respondents include senior executives (43 percent,

fewer than in 2016), area or country managers (13 percent), and department managers (19 percent). These groups of professionals have oversight of, or are directly involved in, day-to-day operations, not only from company headquarters but also from country offices. The relative seniority of respondents has slightly decreased from 2016 to 2018. Two-thirds of respondents are at corporate or regional headquarters (39 percent) or at country branch offices (26 percent). The rest are at local branch offices (10 percent) or independent firms (25 percent).

43 percent of respondents are involved in providing a large range of logistics services as their main line of work. Such services include warehousing and distribution, customer-tailored logistics solutions, courier services, bulk or break-bulk cargo transport, and less-than-full-container, full-container, or full-trailer load transport. 38 percent of respondents are at

companies with business models based on full-container or full-trailer load transport (24 percent) or on customer-tailored logistics solutions (14 percent). These shares have converged as compared to 2016.

Among all respondents, 35 percent deal with multimodal transport, 25 percent with maritime transport, and 13 percent with air transport. These last two numbers are similar to the 2016 ones, while the number of respondents dealing with multimodal transport has gone down. In 2018, 6 percent of respondents handle domestic trade, and 53 percent deal with exports or imports.

Finally, 26 percent work with most of the world's regions, while others concentrate their work in Europe (34 percent), Asia (19 percent), the Americas (14 percent), Africa (4 percent), or the Middle East (3 percent). Hardly any work with Australia and the Pacific (3 respondents).

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## What is the Logistics Performance Index?

Based on a worldwide survey of global freight forwarders and express carriers, the Logistics Performance Index is a benchmarking tool developed by the World Bank that measures performance along the logistics supply chain within a country. Allowing for comparisons across 167 countries, the index can help countries identify challenges and opportunities and improve their logistics performance. The World Bank conducts the survey every two years.

Reliable logistics is indispensable to integrate global value chains—and reap the benefit of trade opportunities for growth and poverty reduction. The ability to connect to the global logistics web depends on a country's infrastructure, service markets, and trade processes. Government and the private sector in many developing countries should improve these areas—or face the large and growing costs of exclusion.



Logistics Performance Index



International Federation  
for Freight Forwarders  
Associations



Global Facilitation Partnership for Transportation and Trade



Turun Yliopisto  
University of Turku



THE WORLD BANK  
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This is the sixth edition of *Connecting to Compete*, a report summarizing the findings from the new dataset for the Logistics Performance Index (LPI) and its component indicators. The 2018 LPI also provides expanded data on supply chain performance and constraints in more than 100 countries, including information on time, distance and reliability, and ratings on domestic infrastructure quality, services, and border agencies. The 2018 LPI encapsulates the firsthand knowledge of movers of international trade. This information is relevant for policymakers and the private sector seeking to identify reform priorities for “soft” and “hard” trade and logistics infrastructure. Findings include:

- Gaps in logistics performance between the bottom and top performers persist.
- Supply chain reliability and service quality are strongly associated with logistics performance.
- Infrastructure and trade facilitation initiatives still play an important role in assuring basic connectivity and access to gateways for most developing countries.
- The logistics policy agenda continues to broaden, with growing focus on supply chain resilience, cyber security, environmental sustainability, and skills shortages.