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advancing sustainable global trade

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SUSTAINABLE TRADE INDEX 2022

Foreword

The world is grappling with some of the toughest geopolitical and macroeconomic challenges in decades. In times like these, the sustainability of trade is more important than ever, and yet it would be tempting for economies to resort to short-term, reactive trade policies.

We publish the Sustainable Trade Index because we believe that economies that pursue sustainable trade ensure that their global relationships are diversified, their resources are optimally allocated, and their policies are geared to share the benefits of trade amongst their stakeholders. Trade is essential to economic growth, but economies need to manage the social and environmental consequences of trade in order to retain support for trade in their communities.

We designed this year's Sustainable Trade Index in cooperation with Switzerland's Institute for Management Development (IMD). IMD's World Competitiveness Ranking is a global benchmark for analyzing how economies manage their competencies to achieve long-term value creation. The Sustainable Trade Index focuses on these competencies through a trade lens to assess how effectively these economies are managing their global commerce.

This index provides a key resource for regulators, business, and communities to shape policies that integrate trade with the prosperity and sustainability of economies.

KATHRYN DIOTH
Chief Executive Officer
Hinrich Foundation

The IMD World Competitiveness Center (WCC) is proud to partner for the first time with the Hinrich Foundation to release the 2022 Sustainable Trade Index. The collaboration helps us fulfil our mission to support governments, companies, and individuals in improving their prosperity and competitiveness, and builds on IMD's commitment towards sustainability.

Ever since the 1990s, globalization has been an important force driving the competitiveness of countries. Competitiveness as an objective of government policy does not come at the expense of other nations; competitiveness is not competition. Therefore, improving living conditions in one country makes other countries better off. Globalization and trade are two major transmission mechanisms for prosperity. Openness, liberalization, the removal of tariffs and trade barriers are among those policy objectives that relate to these, and that we have promoted for years at the WCC. Global trade makes the world a better place.

Alas, the last decade has witnessed a significant, increasing need to get a tighter grip on achieving sustainability objectives. As a result, a new wave of international coordination pursues objectives that seem to be at odds with global trade. Some countries have pushed costs down by disregarding labor standards and environmental protection, and as a way to push export-led growth. It has come a time when nations, companies, and individuals need to question how they balance the need for global trade with the sustainability imperative.

It is with this premise that we are happy to announce the 2022 Hinrich-IMD Sustainable Trade Index. For it tries to assess the extent to which national economies strike a balance between the detrimental social, economic, and environmental impact of their international trade strategies and actions on the one hand, and the financial gains these bring on the other.

We hope our report is helpful for policy makers, corporate leaders, and global citizens alike.

ARTURO BRIS
Director
IMD World Competitiveness Center

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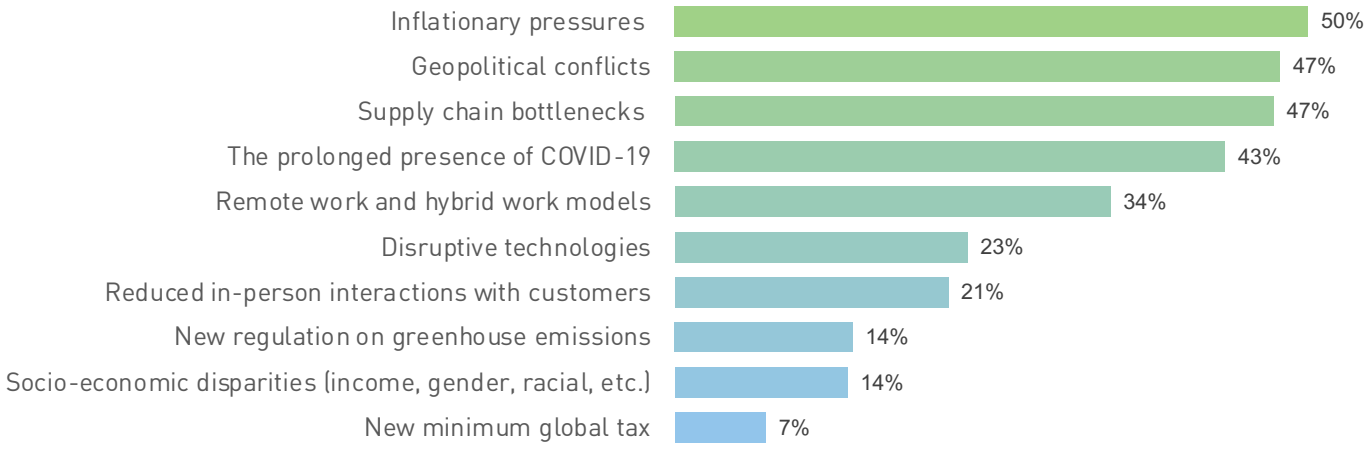
1.0 Introduction: Sustaining value-based trade amidst immediate operational challenges

The latest edition of the Sustainable Trade Index (STI) comes at one of the world's most challenging junctures. The COVID-19 pandemic, which started almost three years ago, brought on a health crisis compounded in quick succession by an economic one. Economies the world over addressed the situation by attempting to restrict the spread of infection and by racing against the clock to produce a vaccine. As economies tried to clamber out of lockdown, their governments, in many cases, injected liquidity to stimulate production and consumption.

According to the 2021 IMD World Competitiveness Ranking, the major concerns that year among executives in 64 economies were related to the prolonged impact of the pandemic, environmental sustainability, and corporate social responsibility.

This year has seen heightened economic uncertainties worldwide along with the reintroduction of geopolitical risks. Unsurprisingly, when executives surveyed for the 2022 IMD World Competitiveness Ranking were asked to rank their concerns, the results showed a greater propensity to look inward. Figure 1 summarizes their responses: executives prioritize short-term challenges that are important for the survival of their companies.

Figure 1. Global challenges impacting businesses



NOTE: The IMD Executive Opinion Survey was run between February 17th, 2022-May 11th, 2022. Only 3% of total responses were collected before the start of the Ukrainian-Russian war (February 24zh, 2022). Based on a sample of 4'097 C-level and mid-level managers from the 63 countries included in the study.

As barriers to trade rise among the world's biggest economies, global macroeconomic conditions are turning increasingly fragile.

In recent years, researchers and analysts have been discussing a shift from globalization to regionalization. Major disruptions have altered the way in which economies interact with each other. From the escalation in punitive tariffs between China and the US to the pandemic and the Russian invasion of Ukraine, economies have turned inward in search of self-sufficiency.

As barriers to trade rise among the world's biggest economies, global macroeconomic conditions are turning increasingly fragile. Inflation is sharply higher across the world. Trade is slowing. The threat of recession is rising in major economies. Supply chain disruptions are increasingly frequent and intense. And the index shows that developed economies are exposed to trading in goods linked to unethical labor practices, including modern slavery, due to insufficient oversight in the provenance of their imports.

International trade is a fundamental component of value creation and, therefore, of the economic growth of economies that participate in it. Even though business leaders have shifted their focus to more company-specific operational challenges, the importance of sustainability in its widest sense remains high. Crucially, it must also be the focus of public decision makers who navigate their economies' strategies while striving to reach the United Nations Sustainable Development Goals for 2030.

1.1 The Hinrich-IMD Sustainable Trade Index: A new index built on a recognized tradition

The newly named STI – The Hinrich-IMD Sustainable Trade Index – analyzes the intersection of international trade and sustainability. It is a revamped framework that builds on prior iterations of the Hinrich Foundation's STI, now with the collaboration of the Institute for Management Development (IMD).

The STI has been published every two years since 2016. With this relaunch, we have expanded the economy sample from 20 to 30 economies, and the indicators from 47 to 70, (please see the Notes and Sources section for the list and sources of the indicators). In addition, we have employed a new methodology (please see the Methodology section for a detailed account of this). As of this edition, the STI will be produced annually.

Specifically, the STI measures the readiness and capacity of economies to participate in the international trading system in a manner that supports their long-term domestic and global goals of

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The index uses 70 indicators grouped into three pillars: economic, societal, and environmental.

economic growth, social capital development, and environmental protection.

It studies 30 economies worldwide, including members of the Asia-Pacific Economic Cooperation (APEC), Canada, Chile, Mexico, Peru, Russia, and the United States (US). It includes Ecuador, and the United Kingdom (UK) as they are applicants for membership to the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP).

The index uses 70 indicators grouped into three pillars: economic, societal, and environmental.

The ***Economic pillar*** measures the ability of an economy to try to foster economic growth through international trade. It includes measures that capture the quality of trade infrastructure, the ease of conducting international trade, export diversification in bilateral trade partnerships, and export goods concentration.

The ***Societal pillar*** captures social factors that contribute to an economy's long-term capacity to conduct trade. Economies are measured against yardsticks for the development of human capital, such as education levels and labor standards. This pillar also captures factors that support a population's tolerance for trade expansion given the costs and benefits of economic growth. These include inequality, political stability, and exploitative practices such as child labor, forced labor, and human trafficking used in an economy's imports and exports.

Finally, the ***Environmental pillar*** measures the extent to which an economy uses natural resources and manages the externalities that arise from its economic growth and participation in the global trading system. We measure the presence of "prudent stewardship" over natural resources and efforts to limit externalities in its overall environmental capital. The indicators to measure environmental capital include measures for air and water pollution. In terms of the possible future impact of trade, we measure national environmental standards, carbon emissions, and share of natural resources in exports.

The next section provides the overall results of the STI 2022. This will be followed by an exploration of the top performers in each pillar and the economies that place in the lower rankings. At the same time, we highlight the strengths and weaknesses of top and bottom economies, aiming to identify the key factors driving their performance. Section 4.0 offers a conclusion.

2.0 STI results 2022

2.1 The top ten

Figure 2.
Top ten economies in the STI 2022

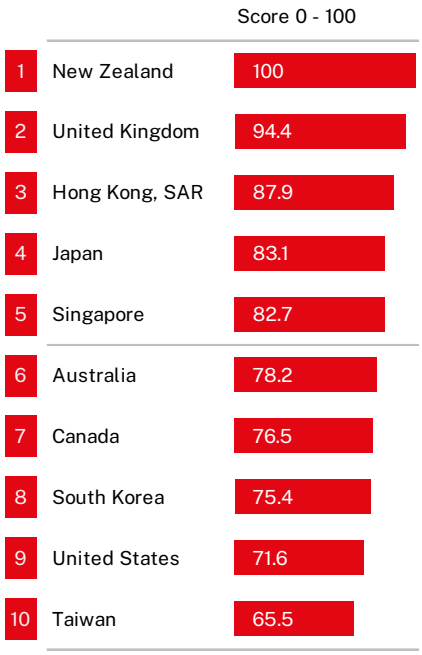

Figure 2 presents the top ten economies in the STI 2022 while Table 1 depicts the performance of all 30 economies, including in the aforementioned three pillars.

2.2 Key takeaways from the top ten

— **New Zealand** reaches first place by performing robustly in all pillars. While it places only seventh in the Economic pillar, it comes first in both the Societal and Environmental pillars.

— **The UK**'s achievement (second) is the net result of strong performances in all pillars.

— **Hong Kong**'s position (third) is greatly fed by its top position in the Economic pillar.

— **Japan**'s performance (fourth) comes on the back of coming ninth in the Economic pillar, fifth in the Societal pillar and fourth in the Environmental pillar.

— **Singapore** (fifth) takes second position in the Economic pillar (its highest position at the pillar level).

— **Australia** (sixth) ranks third in the Societal pillar but comes 11th in the Economic pillar and 14th in the Environmental pillar.

— **Canada** (seventh) is second in the Societal pillar, but 10th and 23rd in the Economic and Environmental pillars, respectively.

— While **South Korea** (eighth) achieves third place in the Economic pillar, it places 16th in the Environmental pillar.

— The **US** (ninth) follows a similar pattern of extremes, with its highest pillar position (fourth) being in the Economic pillar and its lowest (19th) in the Environmental pillar.

— Wrapping up the top ten, **Taiwan** (tenth) comes sixth in both the Economic and Societal pillars but drops to a significant low of 27th in the Environmental pillar.

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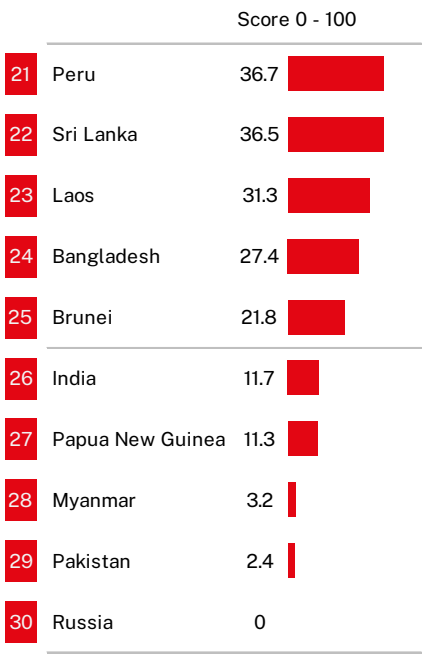
Table 1.
All economies in the STI 2022, including performances per pillar

Economy	Overall	1. Economic Pillar	2. Societal Pillar	3. Environmental Pillar
New Zealand	1	7	1	1
United Kingdom	2	5	4	2
Hong Kong, SAR	3	1	10	8
Japan	4	9	5	4
Singapore	5	2	9	10
Australia	6	11	3	14
Canada	7	10	2	23
South Korea	8	3	8	16
United States	9	4	7	19
Taiwan	10	6	6	27
Chile	11	15	11	9
Philippines	12	19	17	5
China	13	8	24	13
Malaysia	14	13	18	12
Thailand	15	12	15	22
Mexico	16	23	23	3
Cambodia	17	16	26	6
Indonesia	18	18	25	11
Ecuador	19	21	13	20
Vietnam	20	17	16	17
Peru	21	20	14	25
Sri Lanka	22	26	12	15
Laos	23	27	20	7
Bangladesh	24	24	21	21
Brunei	25	14	19	29
India	26	22	29	28
Papua New Guinea	27	28	27	24
Myanmar	28	30	30	18
Pakistan	29	29	28	26
Russia	30	25	22	30

Figure 3.
Last ten economies in the 2022 STI



2.3 The last ten

Figure 3 presents the last ten economies in the STI 2022

2.4 Key takeaways from the last ten

— **Peru**'s position is underlined by a somewhat weak performance in the Economic (20th) and Environmental (25th) pillars, and a relatively stronger performance in the Societal pillar (14th).

— **Sri Lanka**'s strongest performance is in the Societal pillar in which it ranks 12th, followed by the Environmental pillar (15th) and the Economic pillar (26th).

— **Laos** performs strongly in the Environmental pillar (seventh), its ranking declines in the Societal pillar (20th) and it only reaches 27th position in the Economic pillar.

— **Bangladesh** ranks in the bottom ten of the STI across all pillars, reaching 24th position in the Economic pillar, and 21st in both the Societal and Environmental pillars.

— **Brunei** ranks relatively high in the Economic pillar (14th) but drops to 19th in the Societal pillar, further falling in the Environmental pillar to 29th position.

— **India**'s highest ranking at the pillar level is in the Economic (22nd) pillar. Its performance in the other pillars is more deficient, ranking 29th in the Societal pillar and 28th in the Environmental pillar.

— **Papua New Guinea** reaches its highest position in the Environmental pillar (24th). In the Economic pillar it ranks 28th and in the Societal pillar 27th.

— **Myanmar** is in the last position (30th) in the Economic and Societal pillars. Its performance in the Environmental pillar is relatively high at 18th.

— **Pakistan** is 29th in the Economic pillar. While it comes 28th in the Societal pillar, its performance improves in the Environmental pillar where it reaches 26th position.

— **Russia** ranks 25th in the Economic pillar and 22nd in the Societal pillar (its highest position at the pillar level of analysis) but sits at 30th in the Environmental pillar.

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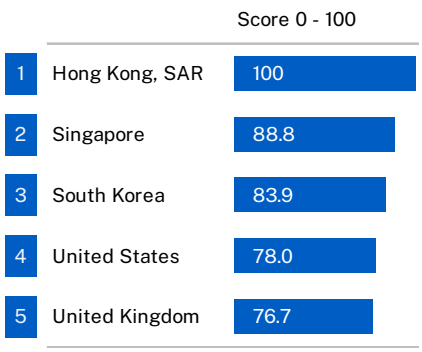
Figure 4.
Top five economies in the Economic pillar



3.0 Pillar-by-pillar analysis

3.1 Economic pillar

Figure 4 presents the top five economies in the Economic pillar.

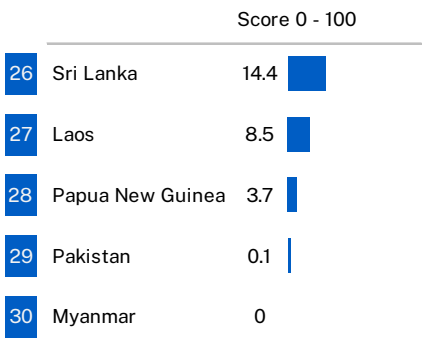
Hong Kong's qualities in the Economic pillar are the driving force behind its third place in the overall STI. The city state is one of the key financial hubs of the Asia-Pacific (APAC) region and excels in attracting capital from foreign investors (net inflows of foreign direct investments accounts for more than 33% of its GDP), meeting the financial needs of its private sector (first place in provision of domestic credit to private sector as percentage of GDP) and ensuring the stability of its public finances (first place in the foreign trade and payments risk indicator).

Hong Kong's technological infrastructure is the highest performing of those economies included in the study (technological infrastructure includes both the speed and extent of broadband and mobile connections). On the other hand, the economy underperforms in terms of labor force growth (28th), export diversification (its international trade is relatively highly concentrated both by products and partners), and fixed capital formation (25th place in gross fixed capital formation as percentage of GDP).

Similarly, **Singapore** ranks second in the Economic pillar, contributing to its fifth place in the overall STI. It is a global financial center and earns high scores in indicators related to foreign direct investments inflows (second), technological innovation (second), and technological infrastructure (third). More importantly, its strengths in this pillar are rooted in a world-beating post-pandemic rebound in GDP terms (real GDP per capita growth at 12.2% in 2021) and in the creation of an efficient trading environment.

In particular, Singapore has the lowest level of trade costs in the STI as it has effectively reduced system inefficiencies such as lengthy custom procedures, opaque legal system, and corruption. It has among the most accessible (second to top) regimes for trade openness (e.g. number of regional trade agreements in force). The Singapore dollar's stable exchange rate (second) also strengthens the Singaporean trading system. Conversely, a shrinking labor force (24th in labor force growth) and limited fixed-capital formation (18th in gross fixed capital formation as a percentage of GDP) constitute areas for improvement.

Figure 5.
Last five economies in the Economic pillar



South Korea takes third place in this pillar thanks to its top-tier technological infrastructure (second), a stable exchange rate (first), and a strong focus on investment in research and development (first in technology innovation). The economy performs well in capital intensive investments (coming fourth in gross fixed capital formation rate at 31.1% of GDP in 2020) and financing its private sector (domestic credit to private sector as percentage of GDP, fifth).

The attraction of foreign investors remains challenging for the South Korean economy (net inflow of foreign direct investments is 0.56% of GDP, 26th) as well as the management of its current account balance and foreign currency reserves (monetary policy framework, 20th). Labor force growth is also meager (0.46% in 2021, 20th).

The **US** performs well in the Economic pillar, placing fourth. Its economy is characterized by high export volumes (exports of goods and services, first), a diversified export base (export concentration indicator, fourth), efficient domestic capital markets (domestic credit to private sector, second) and wide trading and financial linkages with the world (trade liberalization, fifth). It also exhibits top scores in technological innovation (sixth) and technological infrastructure (fifth). Nevertheless, the net inflow of foreign direct investment remains low (1.01% of GDP in 2020). Tariff and non-tariff barriers to trade remain high (29th). The rise in consumer price inflation in the aftermath of the pandemic (4.69% in 2021) also hinders the US' performance in this pillar.

The **UK** ranks fifth in the Economic pillar. Similar to the US, the British economy is characterized by the relative proliferation of trade agreements and freedom of capital movements (trade liberalization, first) as well as strong and diversified exports (export of goods and services, third; export concentration, second). Furthermore, trade costs due to inefficiencies in regulations, customs and/or corruption are minimal (trade costs, third). The UK performs poorly in terms of gross fixed capital formation (26th) and labor force growth (23rd), and still retains significant tariff and non-tariff barriers (24th).

Figure 5 depicts the economies that ranked in the last five places.

Sri Lanka takes the fifth-lowest score in the Economic pillar because of its poor performance in macroeconomic stability (foreign trade and payment risk indicator, 30th; exchange rate stability, 28th; inflation rate – close to 6% in 2021 – 28th) as well as

export volumes (27th) and foreign direct investment inflows (0.54% of GDP in 2020, 27th). The economy also underperforms in terms of technological innovation (26th) and technological infrastructure (23rd).

On the positive side, Sri Lanka has a relatively low export concentration (12th), reinvests a good proportion of its national income in fixed assets (gross fixed capital formation at 25.44% of GDP, eighth), and manages its monetary policy fairly well (monetary policy framework, fourth).

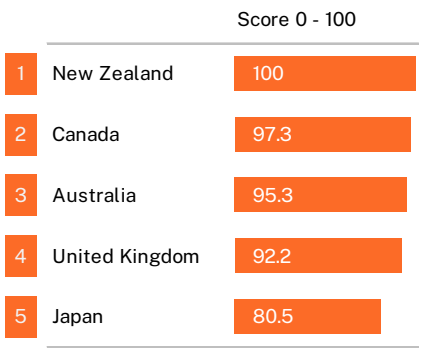
Laos suffers from low GDP growth (real GDP growth per capita at 0.63% in 2021, 27th), a low level of trade openness (trade liberalization indicator, 26th), as well as relatively small export volumes concentrated among few trading partners (around US$7.6 billion in total exports last year, 30th; export concentration, 23rd). The economy has significant inflows of foreign capital (net inflow of foreign direct investments at 5% of GDP in 2020, fifth) and from a sustained growth in its labor force (1.84% between 2020 and 2021, 13th).

Papua New Guinea takes 28th place in the STI, posting low scores in most economic indicators, including macroeconomic performance (real GDP growth per capita at -0.33% in 2021, 28th), technological infrastructure (30th), and innovation capacity (30th). Despite low tariff and non-tariff barriers (second), the economy implements tight regulations on capital movements and investments (trade liberalization, 29th) which hinder its capacity to attract foreign investors (foreign direct investments, 30th). Aside from tariff and non-tariff barriers, it's enjoying relatively strong labor force growth (2.31% between 2020 and 2021, eighth).

Pakistan's underperformance is driven by generally low scores across the board, including inflation (consumer price inflation close to 9% in 2021, 30th), technological infrastructure (29th), foreign trade and payments risk (27th), and exchange rate stability (27th). Positive demographic trends include labor force growth at 2.74%, sixth) and a fair level of diversification in terms of trade partners (export concentration, 13th).

Myanmar comes in at last place in the Economic pillar. Its political difficulties and struggle to recover from the pandemic account for its sharp decline in GDP (real GDP growth per capita -18.5% in 2021, 30th). It is mostly closed to international financial markets (trade liberalization, 30th), and trade costs are inflated by inefficiencies (30th) and a shrinking labor force (-2.34%, 30th). The economy

Figure 6.
Top five economies in the Societal pillar



also faces challenges in terms of R&D investments (technological innovation, 27th) and gross fixed capital formation (28th). On the other hand, Myanmar still exhibits relatively low trade barriers (tariff and non-tariff barriers, fourth).

In conclusion, the data shows that strong performers in the Economic pillar share an emphasis on technological innovation (driven by R&D investments) that support the export of high added-value products; modern technological infrastructure; solid macroeconomic fundamentals; and an open trade environment with low barriers and efficient systems.

3.2 Societal pillar

Figure 6 presents the scores of the top five economies.

New Zealand's performance in the Societal pillar stems from its strengths across indicators (it ranks in the top ten in all the societal indicators). It tops the measure for political stability and absence of violence. New Zealand ranks third in labor standards, an indicator that measures gender diversity in hiring outcomes. It strongly upholds freedom of association and assembly, and it has mostly eliminated or avoided using forced labor or child labor in its economic output (number of goods and percentage of population in forced labor). In a slate of generally strong performance indicators, New Zealand has some room for improvement on income equality (seventh), life expectancy at birth (seventh), and exposure to trade in goods that may have been produced by modern slavery (78th).

Canada's performance in this pillar is underlined by its robust performance (first in both) in social mobility and labor standards. The economy avoids producing goods by forced labor or child labor (second). It ranks fourth in both political stability and educational attainment. The latter reflects the average number of years in schooling among people aged 25 and older, among other factors. One area of underperformance is that Canada remains relatively exposed to trade in goods at risk of having been made by modern slavery (13th).

Australia performs well in educational attainment (second). Another strength (third) is in its government's response to human trafficking, which assesses the criminalization of trafficking and the government's policies to combat it. Australia also ranks third in social mobility and life expectancy at birth. Its lowest ranking under this pillar is in trade in goods at risk of modern slavery.

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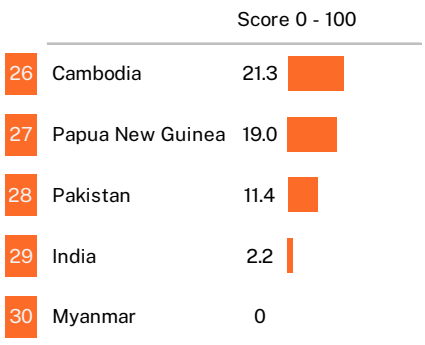
Figure 7.
Last five economies in the Societal pillar



The **UK** ranks fourth in the Societal pillar, largely as a result of its strong performance in government response to human trafficking (second), educational attainment (third), and social mobility (fifth). Its weakness in the pillar is in trade in goods at risk of modern slavery.

Japan tops this pillar for avoiding goods produced by forced labor or child labor and for its high social mobility, ranking first in both indicators. Other strengths are life expectancy at birth (second) and political stability (fifth). Japan's performance is relatively less adequate in government response to human trafficking (18th) and it remains quite exposed to trade in goods at risk of modern slavery (27th).

The data shows common strengths among the top five economies of the Societal pillar. High labor standards and avoidance of goods produced by forced labor or child labor drove the performances of New Zealand and Canada. Conversely, high life expectancy at birth was behind the performances Australia and Japan. Japan, New Zealand, and Canada share a focus on avoiding goods produced by forced labor or child labor.

Educational attainment and social mobility are essential to the strong performances of Canada, Australia, and the UK. Japan also enjoys high social mobility. An additional commonality between Australia and the UK is their emphasis on the government response to human trafficking. It is important to note that the top five economies in this pillar have a common deficiency: they remain relatively exposed to importing goods at risk of having been made by modern slavery, a concern for the long-term viability of sustainable trade.

Figure 7 offers the performance of the five economies that ranked in the last positions in the Societal pillar.

Cambodia places 17th for labor standards and political stability, and 19th in the government's response to human trafficking and trade in goods at risk of modern slavery. Cambodia ranks near the bottom of the table in goods produced by forced labor or child labor (28th) and educational attainment (29th).

Papua New Guinea is relatively unexposed to trade in goods at risk of modern slavery, largely thanks to a relative paucity of imports (fifth). Its next highest score is 16th for goods produced by forced labor or child labor. It is among the most deficient economies of the index in its government's response to human trafficking (27th), its educational attainment (30th), and its life expectancy at birth (30th).

These results highlight the impact of educational attainment in economies... the results also underline the importance of healthcare.

On the positive side, **Pakistan** is a relatively equal society, ranking second by Gini coefficient. It is in 13th position in labor standards and 16th in trade in goods at risk of modern slavery. Among its other deficiencies are: educational attainment (26th), government response to human trafficking, and life expectancy at birth (28th in both). Its lowest attainment is in political stability and absence of violence, in which it ranks the lowest possible (30th).

India is middle of the road in labor standards (15th). It ranks 22nd in social mobility and 24th in educational attainment. It comes in even lower for political stability (27th), government response to human trafficking, and trade in goods at risk of modern slavery (29th in both). It has a lot of goods produced by forced labor or child labor (30th).

Myanmar is a relatively equal society in terms of income disparities (3rd). But it remains exposed to trade in goods at risk of modern slavery (17th) and falls short in educational attainment (27th) and labor standards (29th). Its economy is also exposed to goods produced by forced labor or child labor and has a low life expectancy at birth.

These results highlight the impact of educational attainment in economies, which is a key deficiency of Cambodia, Papua New Guinea, Pakistan, and Myanmar. The results also underline the importance of healthcare, as measured by life expectancy at birth; a shortcoming in Papua New Guinea, Pakistan, and Myanmar.

Another key indicator is the government response to human trafficking, in which Papua New Guinea, Pakistan, and India posted lowest. Goods produced by forced labor or child labor is also an issue shared by Cambodia, India, and Myanmar. Finally, the societal indicators show Pakistan, India, and Myanmar to be marred by political instability and violence.

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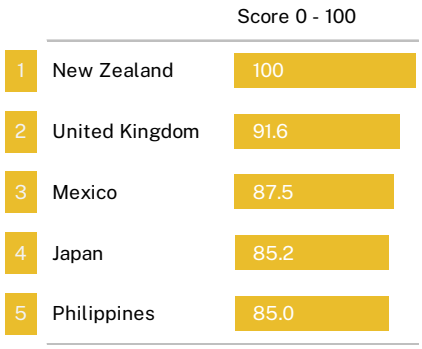
Figure 8.
Top five economies in the Environmental pillar



3.3 Environmental pillar

Figure 8 portrays the five highest-ranked economies in the Environmental pillar.

New Zealand enjoys the least polluted air and tops environmental standards in trade, which assesses the economy's implementation of international conventions for the protection of the environment. New Zealand is also strong in managing carbon policy (fourth) including carbon pricing and carbon dioxide emissions per capita. However, it ranks relatively poorly in deforestation (14th) and in transfer emissions (18th). The economy's lowest ranking in the Environmental pillar is in its ecological footprint (21st), which measures the ecological assets that an economy requires to restore the natural resources it consumes.

The **UK** ranks second for keeping its energy intensity low. It ranks third in indicators including the percentage of wastewater treated, transfer emissions, and carbon management. The economy's more deficient performance in this pillar is in its ecological footprint and management of renewable energy (17th in both). It posts 18th for its share of natural resources in trade.

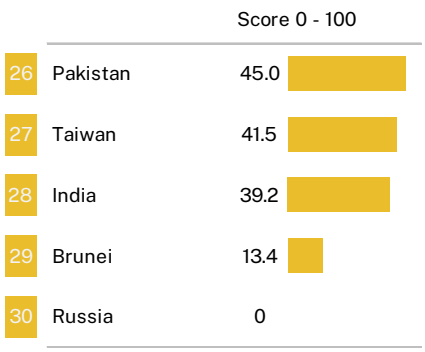
Mexico tops the ranking in carbon management policies and environmental standards in trade. Transfer emissions (eighth), energy intensity (ninth), and the share of natural resources in trade (ninth) are also strengths. Conversely, its ecological footprint (15th), deforestation (16th), air pollution (17th), and relative lack of renewable energy (19th) are Mexico's weaknesses.

Japan's highest ranking in this pillar is in its management of transfer emissions (second). It also shows a strong performance in treating wastewater and managing energy intensity (fourth in both). Its ecological footprint (20th), renewable energy (22nd) and deforestation (27th) are Japan's more deficient rankings in this pillar.

The Philippines earns top marks in environmental standards in trade and fourth position in its ecological footprint. It is also seventh in renewable energy and ninth in transfer emissions. In terms of weaknesses, the Philippines ranks 15th in the percentage of wastewater treated and 18th in deforestation and carbon.

The economies at the top of the Environmental pillar are strong in carbon management policies, and include New Zealand, the UK,

Figure 9.
Last five economies in the Environmental pillar



Mexico, and Japan. High environmental standards in trade also drive the performance of New Zealand, Mexico, and the Philippines. Managing energy intensity plays to the strengths of the UK, Mexico, and Japan, as do transfer emissions. The latter is also a key factor in the Philippines' success in the environmental pillar.

It is important to note that New Zealand, the UK, Mexico, and Japan share a weakness in this pillar: their ecological footprint. Renewable energy is a shortcoming in the performance of the UK, Mexico, and Japan.

Figure 9 shows the economies that were placed in the last five of the Environmental pillar.

Pakistan's performance in this pillar highlights how its economy remains inefficient in terms of energy consumption (energy intensity, 27th) and controlling pollution (air pollution, 29th). The percentage of forest cover in the past year has not grown (deforestation, 30th). The economy's economic output hasn't added to its ecological assets (ecological footprint, first). Its imports and exports are still, relatively speaking, dominated by the exploitation of natural resources (share of natural resources in trade, second).

Compared with other STI pillars, **Taiwan** performs most poorly in environmental terms. It still relies heavily on non-renewable energy sources (at 26th, its renewable energies provide only 1.75% of its energy needs) and produces high levels of carbon dioxide emissions (carbon, 26th). On the positive side, Taiwan posts low air pollution levels (the average annual exposure to PM2.5 particulates is 16.2 micrograms per cubic meter, 10th) and only slightly less than 6% of its exports use natural resources such as ores, metals, mineral fuels, and related materials, placing the economy seventh for this indicator.

India's performance in the Environmental pillar is driven by contrasting results. On the one hand, the economy posts one of the highest levels of PM2.5 exposure in the world (air pollution, 30th) and is one of the most energy intensive economies in the index (energy intensity, 25th). On the other hand, India relies on renewable sources for over 23% of its energy needs (renewable energy, 11th) and its immense ecological resources allow the economy to have a relatively small footprint on the environment (ecological footprint, third).

Measuring the sustainability of trade in 2022

Brunei's dependence on fossil fuels drives its results in this pillar. Brunei underperforms in terms of carbon emissions (carbon, 29th), renewable energy (29th), and the dependence on natural resources of its imports and exports (42% of traded goods by Brunei involve natural resources). On the positive side, Brunei has very low levels of air pollution (fifth).

Dependence on fossil fuels makes **Russia** the least sustainable economy among those included in this study. On top of a poor performance in energy consumption (energy intensity, 29th) and high levels of carbon dioxide emissions (carbon, 27th; transfer emissions, 27th), Russia posts low scores in participation in international agreements on climate change (environmental standards in trade, 29th). Nevertheless, the economy's vast territorial expanse and low population density allow it to maintain low levels of air pollution (air pollution, seventh) and high forest cover growth (deforestation, 13th).

In conclusion, economies at the bottom of the Environmental pillar are generally energy-intensive (i.e., economies that consume high amounts of energy for each dollar of GDP) that rely largely on fossil fuels and produce high levels of carbon dioxide emissions.

4.0 Appreciating the complexities behind the sustainability of trade

The adoption and implementation of good labor standards and the eradication of forced or child labor are fundamental to policy goals.

Despite growing geopolitical risks and economies around the world exhibiting a tendency to turn inward, trade remains essential for growth and prosperity.

There are similarities among high-performing economies in sustainable trade. Under the Economic pillar, robust macroeconomic fundamentals, an open trading environment, and technological innovation – a basis for high value-added products – underlie the performance of economies at the top.

In the Societal pillar, the top five economies' results show that strong numbers in life expectancy, educational foundation, and social mobility are significant for their performance as trading economies. In addition, the adoption and implementation of good labor standards and the eradication of forced or child labor are fundamental to policy goals.

In the Environmental pillar, the top economies are effective at reducing emissions and related externalities, and they ratify and implement international environmental agreements. They also make strides in reducing energy consumption at home.

Still, even top performers carry incipient red flags in their policy management. In the Societal pillar, the top five economies are all, relatively speaking, exposed to the trade of goods at risk of being produced by modern slavery. This is largely due to their high levels of imports of products made in economies that engage in modern slavery. In the Environmental pillar, top-performing economies still sometimes fare poorly in managing their ecological footprint and renewable energy.

Sustainable trade must remain a policy goal of paramount importance. The Hinrich-IMD Sustainable Trade Index showcases the ever-evolving interplay of factors that influence the attainment of this objective, and highlights both the strengths and areas for improvement in a cross-section of economies.

Methodology

A. Definitions

The Hinrich-IMD Sustainable Trade Index

The Hinrich-IMD Sustainable Trade Index measures 30 economies' readiness and capacity to participate in the global trading system in a manner that supports the long-term goals of economic growth, environmental protection, and societal development.

The Economic pillar

The Economic pillar measures an economy's ability to ensure and promote economic growth through international trade. In this category, economies receive scores for indicators that demonstrate a link between the trading system and economic growth.

Some indicators capture the quality of trade infrastructure, while others measure the ease of conducting international trade, such as current account convertibility, exchange rate stability, and trade costs associated with cross-border transactions.

We measure export diversification by evaluating an economy's bilateral trade destinations and how heavily its exports are concentrated by sector – because economies with diversified export markets and products are better equipped to absorb external economic shocks.

Furthermore, we consider the technological infrastructure and innovation capabilities of an economy by assessing its emphasis on research and development investments and digital technologies, which are key drivers for the production of sophisticated and sustainable goods and services.

The Societal pillar

Social factors matter in an economy's capacity to trade internationally over the long term. Economies are measured on the environment that encourages and supports the development of human capital, such as the extent of education and labor standards.

This pillar also captures factors that influence public support for trade expansion. These include income inequality, political stability, goods produced by forced and child labor, and the government response to human trafficking.

The Environmental pillar

The Environmental pillar measures the extent to which an economy's trade supports sustainable resources. The factors include measurements of non-renewable natural resources in trade and the management of externalities that arise from economic growth and participation in the global trading system.

While an economy's capacity to participate in the global trading system is dependent on economic development, achieving sustainable trade requires prudent stewardship of natural resources and limiting externalities in an economy's economic calculus to promote its overall environmental capital. The indicators chosen in this section measure an economy's environmental capital and include indicators for air and water pollution. In terms of future impact, we measure national environmental standards, carbon emissions, and share of natural resources in exports.

B. Data preparation

We establish a reference year for each indicator or sub-indicator. Generally, it is the previous full year but it may be earlier for some data. For the reference year:

1. We first check if data is available for the reference year; if this is the case the data will be considered for calculation.

2. If data for the reference year is unavailable, we check the previous four years before the reference year; if the data is still available more recent data is considered. If the previous four years' data is unavailable, we check for earlier years. We choose the closest year (up to five years back) to the reference year or we categorize that particular indicator as not available, and the data field is left empty.

3. An economy showing an empty data field for a certain indicator will therefore not be listed and ranked for that specific indicator.

Methodology

C. Data processing

For the purpose of this document, we refer to values as the indicator-level data in their original unit of measure. Scores are the rescaled values between 0-100 obtained at step three of the data processing described below. For all indicators, pillars and the overall STI, a high score signifies that an economy performs well in the specific indicator. And, vice versa, a low score corresponds to a poor performance. Finally, rankings refer to the order obtained from sorting the scores of each indicator from the highest to the lowest.

1. We check each indicator for outliers:

    1.1. For each indicator, we calculate its sample average, its standard deviation and the standard values for each of the observations (i.e. economy). If the standard value for the economy (i.e. the difference between the country value and the sample average for the indicator) is bigger than four, then that economy is considered an outlier in that indicator.

    1.2. To guarantee normality of the data, if an outlier is identified in an indicator, the logarithm of that value is considered and replaces the original value in the ranking calculation. This practice reduces the gap between outliers and other economies in the sample.

    We decided to approach outliers as four times the standard deviation and not the more common practice of three times. We did so because in our data the variability is minimal. Therefore, it would be easy to go over three times the standard deviation and thus the number of indicators with outliers would be very high. Increasing the distance to four times the standard deviation allows us to minimize the possibility of such an issue.

2. For those indicators that contain sub indicators (or sub-sub indicators):

    2.1. At the sub-indicator level, we rescale at the values between 0 and 100. The best value takes the score of 100 and the worst the value of 0. If, for an indicator, the highest value is a better outcome, then the economy with the highest value will be scored as 100 and the economy with the lowest value will be scored as 0. In the opposite scenario,

the economy with the lowest value in the indicator (i.e. better outcome) will get the highest score (100) while the economy showing the highest value will be assigned a score of 0. For specific details on what constitute the best/ worst outcome in each indicator see the Notes and Sources section.

2.2. Next, the values for sub indicators are averaged out to construct the principal indicator.

2.3. For those indicators that contains the sub-sub indicators, we first follow the same steps to construct the sub indicator (step 2.2 above); once sub indicators are constructed, we follow the same steps to obtain the sub-sub-indicator.

3. All the indicators are rescaled between 0 and 100. Within each, the best value will be scored 100 and the worst 0.
This rescaling step enables us to compare indicators to each other.

4. Within each pillar all indicators are averaged to construct the pillar.

5. All pillars are rescaled between 0 and 100.
Rescaling all pillars reduces the impact of the uneven distribution of indicators among pillar and thus makes them comparable to each other.

6. The three pillars are averaged to obtain the overall score, which is presented rescaled between 0 and 100. We do so to maintain consistency in scores (0-100) throughout all levels of analysis, from the sub-sub-indicators up to the overall.

D. New and updated indicators

We have added new indicators and updated other components to further refine the index from prior iterations.

Notes and sources

[H] High value promotes global trade
[L] Low value promotes global trade
[sum] Indicator has sub-indicators

	Indicator	Source	Definition
1.01.	Consumer price inflation	IMF	Harmonized inflation rates, year average. [L]
1.02.	Real GDP Growth per capita, % GDP	WEO, Taiwan: DGBAS	GDP is expressed in current U.S. dollars per person. Data are derived by first converting GDP in national currency to U.S. dollars and then dividing it by total population. [H]
1.03.	Growth in labor force, %	World Bank, Taiwan: DGBAS	Labor force comprises people ages 15 and older who supply labor for the production of goods and services during a specified period. It includes people who are currently employed and people who are unemployed but seeking work as well as first-time job-seekers. Not everyone who works is included, however. Unpaid workers, family workers, and students are often omitted, and some countries do not count members of the armed forces. Labor force size tends to vary during the year as seasonal workers enter and leave. [H]
1.04.	Foreign direct investment, net inflows, % GDP	World Bank, Taiwan: Central Bank, Balance of Payments Quarterly	Foreign direct investment are the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net inflows (new investment inflows less disinvestment) in the reporting economy from foreign investors, and is divided by GDP. [H]
1.05.	Gross fixed capital formation, % GDP	World Bank, Taiwan: DGBAS	Gross fixed capital formation (formerly gross domestic fixed investment) includes land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. According to the 1993 SNA, net acquisitions of valuables are also considered capital formation. [H]
1.06.	Tariff & non-tariff barriers	Global Trade Alert	Six indicators measuring tariff and non-tariff barriers. [sum]
1.06.01.	Tariff barriers	Global Trade Alert	Three indicators measuring tariff barriers. [sum]
1.06.01.a.	Tariff barriers in force	Global Trade Alert	Count of 'harmful' tariff measures currently in force. [L]
1.06.01.b.	New tariff barriers 2021	Global Trade Alert	Count of new (2021) 'harmful' tariff measures currently in force. [L]
1.06.01.c.	Percentage of trade affected by tariff barrier (up to 2018)	Global Trade Alert	Estimates of the import shares potentially affected 'harmful' tariff measures currently in force (up to 2018). [L]
1.06.02.	Non-tariff barriers	Global Trade Alert	Three indicators measuring non-tariff barriers. [sum]
1.06.02.a.	Non-tariff barriers in force	Global Trade Alert	Count of 'harmful' non-tariff measures currently in force. [L]

	Indicator	Source	Definition
1.06.02.b.	New non-tariff barriers 2021	Global Trade Alert	Count of new (2021) 'harmful' non-tariff measures currently in force. [L]
1.06.02.c.	Percentage of trade affected by non-tariff barrier (up to 2018)	Global Trade Alert	Estimates of the import shares potentially affected 'harmful' non-tariff measures currently in force (up to 2018). [L]
1.07.	Trade liberalization	WTO, KAOPEN, Freedom House	Three indicators measuring trade liberalization. [sum]
1.07.01.	Regional Trade Agreements, number in force	WTO	Any reciprocal trade agreement between two or more partners, not necessarily belonging to the same region. [H]
1.07.02.	Capital account liberalization, Index	KAOPEN	The Chinn-Ito index (KAOPEN) is an index measuring a country's degree of capital account openness. The index was initially introduced in Chinn and Ito (Journal of Development Economics, 2006). KAOPEN is based on the binary dummy variables that codify the tabulation of restrictions on cross-border financial transactions reported in the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER). [H]
1.07.03.	Investment Freedom, Index	Freedom House	Investment freedom evaluates a variety of regulatory restrictions that typically are imposed on investment. Points are deducted from the ideal score of 100 for each of the restrictions found in a country's investment regime. [H]
1.08.	Exchange rate stability, parity change from national currency to SDR, 2020/2018	IFS	Parity changes are in aboslute values. Period average for all countries. [L]
1.09.	Domestic credit to private sector, % of GDP	IMF	Domestic credit to private sector refers to financial resources provided to the private sector by financial corporations, such as through loans, purchases of nonequity securities, and trade credits and other accounts receivable, that establish a claim for repayment. For some countries these claims include credit to public enterprises. The financial corporations include monetary authorities and deposit money banks, as well as other financial corporations where data are available (including corporations that do not accept transferable deposits but do incur such liabilities as time and savings deposits). Examples of other financial corporations are finance and leasing companies, money lenders, insurance corporations, pension funds, and foreign exchange companies. [H]
1.10.	Foreign trade and payments risk	IMF, SP, Moodys, Fitch and SWI	Two indicators measuring foreign trade and payment risk. [sum]
1.10.01.	Country credit rating	SP, Moodys, Fitch and SWI	IMD WCC created Index of three country credit ratings (Fitch, Moodys, S&P) and SWI. Each, including the outlook, is converted to a numerical score and averaged for each country, with a possible range 0-80. [H]
1.10.02.	Gross debt, % GDP	IMF WEO	Private nonguaranteed external debt comprises long-term external obligations of private debtors that are not guaranteed for repayment by a public entity. Data are in current U.S. dollars. [L]

	Indicator	Source	Definition
1.11.	Trade costs	Transparency International, World Bank	Three indicators measuring country specific external, indirect costs on trade (rule of law, corruption, logistics). [sum]
1.11.01.	Logistics performance, index	Transparency International	LPI 2018 ranks countries on six dimensions of trade -- including customs performance, infrastructure quality, and timeliness of shipments. The data used in the ranking comes from a survey of logistics professionals. [H]
1.11.02.	Corruption perceptions, index	World Bank	The CPI is calculated using 13 different data sources from 12 different institutions that capture perceptions of corruption within the past two years. The data sources are standardized to a scale of 0-100 where a0 equals the highest level of perceived corruption and 100 equals the lowest level of perceived corruption [H]
1.11.03.	Rule of law, index	World Bank	Perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. [H]
1.12.	Monetary policy intervention	IMF	Two indicators measuring an economy's potential capacity to intervene in and influence exchange rates. [sum]
1.12.01.	Current account balance, % GDP	IMF	Current account balance is the sum of net exports of goods and services, net primary income, and net secondary income. [L]
1.12.02.	Total reserves (includes gold)1 year change, % GDP	IMF	Total reserves comprise holdings of monetary gold, special drawing rights, reserves of IMF members held by the IMF, and holdings of foreign exchange under the control of monetary authorities. The gold component of these reserves is valued at year-end (December 31) London prices. Data are in current U.S. dollars. [L]
1.13.	Export concentration	UNCTAD	Two indicators measuring the export concentration in markets and products. [sum]
1.13.01.	Export market concentration, Top 5 as % total	UNCTAD	Top five named export countries as a percentage of total exports. [L]
1.13.02.	Export product concentration, Top 5 as % total	UNCTAD	Top five named export products, as a percentage of total exports, using the UNCTAD product data based on the SITC commodity classification, Revision 3, at the two-digit level; giving 74 product categories [L]
1.14.	Exports of goods and services	WTO	Two indicators measuring merchandise and commercial services exports. [sum]
1.14.01.	Merchandise exports, US$	WTO	Compiled from national data sources, WTO, IMF International Financial Statistics and the Trade Data Monitor online database. If data from national sources are not available at the time of release, estimates are produced based on partner trade statistics. [H]
1.14.02.	Commercial services exports, US$	WTO	Commercial services include transport, travel, and other private services (communication; construction; insurance; financial; computer and information (including news), royalties and licence fees; other business services (legal, accounting, consulting, public relations, advertising, market research, architectural, engineering, and other technical services) [H]
1.15.	Technological innovation	UNESCO, WIPO, COMTRADE, NSF	Five indicators measuring research and development. [sum]

	Indicator	Source	Definition
1.15.01.	R&D expenditure, % GDP	UNESCO, Taiwan: OECD MSTI	The sum of financial resources (national and foreign) used for the execution of research and experimental development (R&D) works on the national territory by the public sector and by the business enterprise sector. It includes current expenditure (annual wages and salaries of R&D personnel and operating expenses) and capital expenditure (purchases of equipment required for R&D). [H]
1.15.02.	Researchers in R&D, per capita	UNESCO, Taiwan: OECD MSTI, Peru: National Council for Science, Technology and Technological Innovation	Researchers in R&D are professionals engaged in the conception or creation of new knowledge. Products, processes, methods, or systems and in the management of the projects concerned. [H]
1.15.03.	Patent applications, per million inhabitants	WIPO, Taiwan: TIPO	Total patent applications (Direct and PCT national phase entries per million inhabitants. [H]
1.15.04.	High-technology exports, % of manufactured exports	COMTRADE	High-technology exports are products with high R&D intensity, such as in aerospace, computers, pharmaceuticals, scientific instruments, and electrical machinery. [H]
1.15.05.	Scientific articles, per million people	NSF National Science & engineering Indicators Hong Kong, SAR: University Grants Committee	Article counts are from a selection of journals, books and conference proceedings in S&E from Scopus [H]
1.16.	Technological infrastructure	ITU via World Bank, Ookla, M-Labs, SpeedTestNet.io	Four indicators measuring the technological infrastructure, internet quality and penetration, and mobile penetration. [sum]
1.16.01.	Fixed internet speed, Mbps	Ookla, M-Labs / cable.co.uk: https://www.cable.co.uk/broadband/speed/worldwide-speed-league/, SpeedTestNet.io	average connection speed in Mbps: data transfer rates for Internet access by end users. Values presented are a weighted average of three internet speed tests Ookla, M-Lab, SpeedTestNet.io. [H]
1.16.02.	Internet users, % population	ITU via World Bank, Taiwan: National Communications Commission	Internet users are individuals who have used the Internet (from any location) in the last 3 months. The Internet can be used via a computer, mobile phone, personal digital assistant, games machine, digital TV etc. [H]
1.16.03.	Fixed broadband subscriptions	ITU via World Bank, Taiwan: National Communications Commission	Fixed broadband subscriptions refers to fixed subscriptions to high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This includes cable modem, DSL, fiber-to-the-home/building, other fixed (wired)-broadband subscriptions, satellite broadband and terrestrial fixed wireless broadband. This total is measured irrespective of the method of payment. It excludes subscriptions that have access to data communications (including the Internet) via mobile-cellular networks. It should include fixed WiMAX and any other fixed wireless technologies. It includes both residential subscriptions and subscriptions for organizations. [H]

	Indicator	Source	Definition
1.16.04.	Mobile subscriptions (per 100 people)	ITU via World Bank, Taiwan: National Communications Commission	Mobile cellular telephone subscriptions are subscriptions to a public mobile telephone service that provide access to the PSTN using cellular technology. The indicator includes (and is split into) the number of postpaid subscriptions, and the number of active prepaid accounts (i.e. that have been used during the last three months). The indicator applies to all mobile cellular subscriptions that offer voice communications. It excludes subscriptions via data cards or USB modems, subscriptions to public mobile data services, private trunked mobile radio, telepoint, radio paging and telemetry services. [H]
2.01.	Inequality (Gini coefficient)	World Bank,Taiwan: Report on the Survey of Family Income and Expenditure, R.O.C., 2020,Hong Kong, SAR: Census and Statistics Department,New Zealand: OECD	Gini index measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution. A Lorenz curve plots the cumulative percentages of total income received against the cumulative number of recipients, starting with the poorest individual or household. The Gini index measures the area between the Lorenz curve and a hypothetical line of absolute equality, expressed as a percentage of the maximum area under the line. Thus a Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality. [L]
2.02.	Educational attainment	HDR, THES, World Bank	Three indicators measuring the attainment and quality of education. [sum]
2.02.01.	Mean years of schooling	UN HDR, Taiwan: Directorate-General of Budget, Accounting, and Statistics, Taiwan (ROC)	Average number of years of education received by people ages 25 and older, converted from education attainment levels using official durations of each level. [H]
2.02.02.	University education Index	THES	IMD constructed index to capture the quality of universities. Measures the (1) number, (2) score, (3) score per capita, of the universities in THES 1'000. [H]
2.02.03.	Tertiary enrollment	World Bank, Taiwan: Ministry of Education	Gross enrollment ratio is the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education shown. Tertiary education, whether or not to an advanced research qualification, normally requires, as a minimum condition of admission, the successful completion of education at the secondary level. [H]
2.03.	Labor standards	World Bank	Two indicators measuring employee rights, including gender equality and collective bargaining. [sum]
2.03.01.	Gender non-discrimination in hiring	World Bank Women, Business and the Law [https://wbl.worldbank.org/]	Assessment of whether the law mandates nondiscrimination based on gender in employment 0-5. 1 point for each: (1) Can a woman get a job in the same way as a man? (1) Does the law prohibit discrimination in employment based on gender? (1) Is there legislation on sexual harassment in employment? (1) Criminal penalties or (1) civil remedies for sexual harassment in employment? [H]
2.03.02.	Freedom of association and assembly	World Bank	Existence and enforcement of laws that allow citizens the right to assemble freely and associate into groups such as political parties and trade unions among others. [H]

	Indicator	Source	Definition
2.04.	Political stability and absence of violence	World Bank Political Stability and Absence of Violence	Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism. [H]
2.05.	Goods produced by forced labor or child labor	US Bureau of International Labor Affairs (ILAB), Global Slavery Index	Three indicators measuring the extent of forced labor or child labor. [sum]
2.05.01.	Goods produced by forced labor	US Bureau of International Labor Affairs (ILAB), Global Slavery Index	Two indicators measuring the extent of forced labor. [sum]
2.05.01.a.	Goods produced by forced labor, number of goods categories	US Bureau of International Labor Affairs (ILAB)	Matrix of goods and their source countries which ILAB has reason to believe are produced by child labor or forced labor in violation of international standards, as required under the Trafficking Victims Protection Reauthorization Act (TVPRA). [L]
2.05.01.b.	% population in forced labor	Global Slavery Index	% population in forced labor. [L]
2.05.02.	Goods produced by child labour, number of goods categories	US Bureau of International Labor Affairs (ILAB)	Matrix of goods and their source countries which ILAB has reason to believe are produced by child labor or forced labor in violation of international standards, as required under the Trafficking Victims Protection Reauthorization Act (TVPRA). [L]
2.06.	Government response to human trafficking	US Department of State, Global Slavery Index	Three indicators measuring the government response to human trafficking. [sum]
2.06.01.	Government response to human trafficking, Criminalization	US Department of State, Hong Kong, SAR: Same as China	Number of conventions Ratified or Accession. [H]
2.06.02.	Government response to human trafficking, Strategy	Global Slavery Index	Government response score. [H]
2.06.03.	Government response to human trafficking, Action	US Department of State	The country's tier ranking is based on the government's efforts to combat trafficking as measured against the TVPA minimum standards and compared to its efforts in the preceding year. Score 1-4 corresponding to countries Tier. [L]
2.07.	Trade in goods at risk of modern slavery	Comtrade + Global Slavery list	Two indicators measuring the extent that imports and exports adhere to international labor labor standards. [sum]
2.07.01.	Imports of goods at risk of modern slavery, US$ millions	Comtrade + Global Slavery list, Taiwan: Comtrade recorded as 'Other Asia, nes'	Value of imports in goods and country combinations identified as at risk of modern slavery. [L]
2.07.02.	Exports of goods at risk of modern slavery, US$ millions	Comtrade + Global Slavery list, Taiwan: Comtrade recorded as 'Other Asia, nes'	Value of exports in goods and country combinations identified as at risk of modern slavery. [L]
2.08.	Social mobility, Index	World Economic Forum	The Index measures the intergenerational social mobility in different countries in relation to socioeconomic outcomes. [H]

	Indicator	Source	Definition
2.09.	Life expectancy at birth	UN HDR, Taiwan: Directorate-General of Budget, Accounting, and Statistics, Taiwan (ROC)	Life expectancy at birth indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life. [H]
3.01.	Air pollution	OECD, Taiwan: EPA, Hong Kong, SAR: Environmental Protection Department	Levels of particulate matter 2.5 (PM 2.5), to capture the air pollution in a country. [L]
3.02.	Deforestation	Yale Environmental Performance Index	Index of the change in a country's forest cover. (NOTE: index, not the value of change). [H]
3.03.	% of wastewater treated	WHO, Taiwan: The Statistical Yearbook of Construction and Planning Agency, Ministry of the Interior	% of wastewater treated. [H]
3.04.	Energy intensity	IEA	The amount of energy consumed (production + imports - exports - bunkers - stock changes) for each dollar of gross domestic product. [L]
3.05.	Ecological footprint	Global Footprint Network	the Ecological Footprint adds up all the productive areas for which a population, a person or a product competes. It measures the ecological assets that a given population or product requires to produce the natural resources it consumes (including plant-based food and fiber products, livestock and fish products, timber and other forest products, space for urban infrastructure) and to absorb its waste, especially carbon emissions. [L]
3.06.	Renewable energy	IEA	Share of renewables in total energy requirements, %. [H]
3.07.	Environmental standards in trade	UN Treaty Collection,Taiwan: Management Regulations for the Import and Export of Industrial Waste	Count of whether seven conventions are ratified, implemented or not. [sum]
3.07.01.	Convention: Hazardous Wastes	UN Treaty Collection, Taiwan: Management Regulations for the Import and Export of Industrial Waste	Count of whether the convention is (1) ratified, (2) implemented or (0) not. [H]
3.07.02.	Convention: Prevention of Marine Pollution	UN Treaty Collection, Taiwan: Marine Pollution Control Act	Count of whether the convention is (1) ratified, (2) implemented or (0) not. [H]

	Indicator	Source	Definition
3.07.03.	Convention: Protection of the Ozone Layer (Vienna)	UN Treaty Collection, Taiwan: https://www.epa.gov.tw/eng/5BF64A445908C525 (evidence of 0)	Count of whether the convention is (1) ratified, (2) implemented or (0) not. [H]
3.07.04.	Convention on Climate Change (Kyoto)	UN Treaty Collection, Taiwan: https://www.epa.gov.tw/eng/5BF64A445908C525 (evidence of 0)	Count of whether the convention is (1) ratified, (2) implemented or (0) not. [H]
3.07.05.	The International Timber Agreement	UN Treaty Collection, Taiwan: Regulations for Management of Protection Forest	Count of whether the convention is (1) ratified, (2) implemented or (0) not. [H]
3.07.06.	Convention: International Trade in Endangered Species	UN Treaty Collection, Taiwan: Regulations on Import and Export of Endangered Species of Wild Fauna, Flora and Related Products	Count of whether the convention is (1) ratified, (2) implemented or (0) not. [H]
3.07.07.	Convention: Prior Informed Consent - Hazardous Chemicals (Rotterdam)	UN Treaty Collection, Taiwan: no evidence	Count of whether the convention is (1) ratified, (2) implemented or (0) not. [H]
3.08.	Transfer emissions	Global Carbon Project	Transfer emissions as a share of a country's total territorial emissions (MtCO2). Countries with dirty export industries contribute to an unsustainable model for global trade. [L]
3.09.	Share of natural resources in trade	UNCTAD	Natural resources (ores and metals, mineral fuels, lubricants and related materials) as a percentage of a country's total trade. [L]
3.10.	Carbon	World Bank, EDGAR	Two indicators measuring the extent of CO2 emissions, and accounting for the externalities. [sum]
3.10.1.	Carbon pricing	World Bank Carbon Pricing Dash Board	Count of whether the (2) Carbon pricing is currently in effect at the national level, (1) Carbon pricing is scheduled for implementation but is not currently in effect, or (0) Carbon pricing is neither scheduled for implementation nor currently in effect. [H]
3.10.2.	CO2 emissions per capita	EDGAR - Emissions Database for Global Atmospheric Research	CO2 emissions by country/region name and include all human activities leading to climate relevant emissions, except biomass/biofuel combustion (short-cycle carbon). [L]

About us

Global trade has helped lift hundreds of millions of people around the world out of poverty, but the benefits of trade do not come without their risks. If an economy is unprepared for the consequences of trade growth, it may result in labor disruption, environmental degradation, and worsening inequality. Proactive and responsible government policy and farsighted corporate decision-making can harness the benefits of trade and mitigate its excesses.

The Hinrich Foundation and the IMD World Competitiveness Center have combined their expertise to build the Hinrich-IMD Sustainable Trade Index, a framework for policy makers, business executives, and civil society leaders to understand and advance sustainable global trade.

hinrich foundation

advancing sustainable global trade

The Hinrich Foundation is a unique Asia-based philanthropic organization that works to advance mutually beneficial and sustainable global trade.

We believe sustainable global trade strengthens relationships between nations and improves people's lives. We support original research and education programs that build understanding and leadership in global trade. Our approach is independent, fact-based and objective. We are an authoritative source of knowledge, sharp analysis and fresh thinking for policymakers, business, media and scholars engaged in global trade.

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IMD / World Competitiveness Center

IMD is an independent academic institution with Swiss roots and global reach, founded over 75 years ago by business leaders for business leaders. Since its creation, IMD has been a pioneering force in developing leaders who transform organizations and contribute to society.

The IMD World Competitiveness Center is dedicated to the advancement of knowledge on world competitiveness and offers benchmarking services for countries and companies using the latest and most relevant data on the subject. The Center has pioneered research on how nations and enterprises compete to lay the foundations for future prosperity.

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