Chapter 2

Identifying alternative economic development strategies for SIDS

In this chapter, we present a simple evaluation framework for SIDS economies, to identify different typologies of SIDS and match them with alternative economic development strategies.

2.1 Selected economic development strategies

In the first subsection, we outline the main economic development strategies pursued by countries in the post-war period. For each strategy, we cite some real-world examples, to then identify prerequisite endowments for countries to follow each strategy. This then frames the subsequent analysis of SIDS' existing endowments (Screen 1) and economic structure (Screen 2).

2.1.1 Manufacturing-led industrialisation

Manufacturing has long been the focal sector for achieving economic growth and development. Compared to agriculture or services, manufacturing has historically allowed for greater accumulation of technology, leading to higher labour productivity and wages, as well as opportunities for greater economies of scale. In practice, this strategy has often involved a developing country investing and directing the allocation of factors of production to, in a first instance, light manufacturing. This first phase of industrial policy is typically bolstered by trade policy that protects local producers and favours import substitution in target industries. The first phase of manufacturing-led growth drives technology accumulation, human capital development and an expansion of productive capacity. Subsequent phases involve industrial upgrading, more openness to trade and a shift to export-led growth (Szirmai, 2009).

Successful examples of this strategy include, before World War II, the now-advanced economies in Europe, North America and then Japan. In the post-war period, East Asian economies followed manufacturing-led strategies, including the Republic of Korea and Taiwan, the Province of China and, more recently, China itself. Among small island developing states (SIDS), Singapore successfully transformed its economy with a manufacturing-led strategy and Mauritius is following a similar path (Government of Mauritius, 2020).

Nevertheless, employing manufacturing-led strategies has become increasingly complicated by countries' commitments under trade and investment agreements, which often contain clauses that restrict the use of trade and industrial policy to protect infant industries.

In general, countries that have succeeded in developing manufacturing as an engine of economic growth and development were able to mobilise a critical mass

of factors of production. These have included, in particular: a) **a surplus labour force**, often in the form of workers migrating from low-productivity agricultural employment in rural areas to wage-earning factory jobs in cities; b) **a stock of private and public savings** that has been invested in, c) the **accumulation of productivity-enhancing technology**, such as physical and human capital, infrastructure, and research and development (R&D) (Kaldor, 1967; Kuznets, 1966; Timmer et al., 2015).

2.1.2 Natural resource-led industrialisation

Exploiting endowments of natural resources is another strategy for driving economic growth and development. These resources can include, for example, non-renewable deposits of minerals, oil and natural gas, or renewable resources, such as agricultural land, fish stocks and forests.

Developing these natural resources to produce raw materials creates a stream of rents for the developing country to reinvest in industrial development, either through vertical integration and upgrading in the commodity value chain itself, or through diversification into other industries.

Variants of this strategy often depend on the entry barriers associated with the production models for different commodities. For example, the production of agricultural commodities is labour intensive and requires relatively little physical capital and expertise, making it accessible to small family farms. Although value-added processing of agricultural commodities can be done with relatively simple machines, the globalisation of commodity value chains means it is difficult to compete with the economies of scale and technology-driven productivity of processors in more advanced economies.

By contrast, the extraction of minerals, oil and natural gas is highly capital intensive, often limiting the possibility of direct participation by host country governments, firms and workers. Similarly, value-added processing of extractive commodities requires economies of scale and major capital investments. As a result, extractive projects in developing countries typically rely on a small number of foreign investors and operate largely as enclaves, with few linkages to the domestic economy, while directly exporting their commodities as raw or primary products.

Among developing countries, variants of natural resource-led industrialisation therefore tend to flow from the underlying production models. Agricultural commodities allow for farmers, traders and primary processors to earn a livelihood. Major producers, such as Brazil, China and India, have managed to upgrade into value-added processing and have relatively integrated value chains for some crops. Other more limited examples exist: countries that have succeeded in entering value-added industries without vertical integration, such as Bangladesh, Egypt, Mauritius or Turkey. Nevertheless, developing competitive value-added processing remains a difficult proposition for small economies.

Meanwhile, exporters of extractive commodities are typically restricted to industrialisation through horizontal diversification; that is, investing their share of

the rents into other sectors. For example, Indonesia and Iran invested oil revenues in manufacturing and other industrial subsectors, while Nigeria is currently investing oil revenue in agricultural development.

'Blue economy' strategies are a new variant[1] on natural resource-led development, a variant that has relevance for SIDS. On one hand, blue economy strategies rely, in a classic sense, on developing a country's natural marine and coastal endowments, such as fish stocks, subsea mineral resources and beaches. On the other hand, to a much greater degree than classic natural resource-based strategies, the blue economy concept aims to balance socioeconomic development with the conservation of ocean and coastal ecosystems.

Blue economy strategies appear well suited to SIDS, whose exclusive economic zones (EEZs) are often more than 30 times as large as their land area and whose vulnerability to climate change, by way of ocean and coastal habitat, is extreme.

As a recent economic development strategy, no established country examples exist. Indeed, most SIDS lack the capacity and resources to map and enforce their claims to their vast EEZs. This means, in practice, that the blue economy concept remains aspirational, with many SIDS still relying on the established mix of tourism and nearshore fisheries, and potentially selling offshore fishing rights to foreign vessels. A lack of resources and capacity prevents many SIDS from effectively monitoring and enforcing their offshore fisheries, leaving them at great risk of illegal, unreported and unregulated (IUU) fishing and the depletion of fish stocks.

Nevertheless, a growing body of literature on the blue economy emphasises the need to diversify the economic use of ocean and coastal resources beyond just capture fisheries and tourism, and into other activities, such as:

- subsea mining;
- water desalination;
- renewable energy, such as offshore wind farms or fuels from algae biomass;
- bioprospecting of marine genetic resources for pharmaceutical or chemical applications;
- mariculture, i.e. ocean aquaculture;
- maritime cultural and heritage activities; and/or
- regional or multimodal hubs for transportation and related services.

With their emphasis on sustainability, blue economy strategies must balance the development of economic activities with policies that promote shared conservation responsibilities among users, to valorise and preserve ocean ecosystem services, such as fisheries, carbon sequestration, waste and pollution absorption (UNCTAD, 2014).

For the purposes of our evaluation framework, the basic endowments necessary to pursue a blue economy development strategy are **ocean area and coastal distance**.

For natural resource-led industrialisation, the critical endowments are:

- Agricultural variant: agricultural land
- Extractive variant: reserves of non-renewable natural resources
- Blue economy variant: **ocean area and coastal distance and fish stocks**

2.1.3 Service-driven development

Countries pursuing service-driven development strategies aim to achieve structural transformation by leveraging opportunities created by new technologies – especially information and communication technologies (ICTs) – to transition from a reliance on agriculture to a service-based economy. This strategy diverges from orthodox economic development theory, based on the history of structural transformation of advanced economies, which prescribes an initial transition from agriculture to low-value manufacturing, followed by industrial upgrading and an eventual transition to services.

Sometimes called 'leapfrog' strategies, service-driven strategies include at least two variants. The first involves adopting ICT technologies to skip traditional steps in industrial upgrading, jumping instead to the latest opportunities. Bypassing fixed-line to adopt mobile telephony is an established example of this variant, while an emerging example is the development of off-grid and mini-grid electricity, using photovoltaic or wind turbine technologies, in isolated rural areas (UNCTAD, 2018).

The second variant involves using ICT technologies to create new service industries, such as outsourced call centres overseas, in countries such as Bangladesh, India or the Philippines, or the rise of mobile payment platforms in Africa (Blimpo et al., 2017). Provided countries are able to make sufficient investments in infrastructure and skilled workers, service-driven strategies may also open new opportunities in the so-called 'Fourth Industrial Revolution' (Ashgar et al. 2020).

There exist examples of service-driven strategies based on a range of subsectors, including health services, financial services and technology, information and communication services, renewable energy, and transportation. Nevertheless, most service-based SIDS economies rely disproportionately on tourism (UNWTO, 2012). Prior to the COVID-19 pandemic, tourism generated approximately US$30 billion per year for SIDS, representing their main source of foreign exchange and more than 30 per cent of GDP, on average (UNCTAD, 2020a).

Service-driven development strategies respond to the significant barriers that developing countries face when trying to enter mature manufacturing industries, as well adjusting to de-industrialisation trends observed in recent decades in some regions, e.g. southern Africa. On the other hand, manufacturing activities typically offer the best long-term opportunities to improve labour productivity, wages and technology transfer. Service-driven strategies, especially those based on low-technology services such as tourism, may therefore offer fewer opportunities for long-term improvements in productive capacity and structural transformation (McCausland and Theodossiou, 2012; Haraguchi et al., 2016).

For the purposes of our evaluation framework, the basic endowments and conditions necessary to pursue a basic service-driven development strategy are a) **a surplus labour force,** and b) **access to basic infrastructure**. For the latter, each service subsector may rely more heavily on some forms of infrastructure, but not others. For example, tourism relies heavily on airport and transportation infrastructure, fisheries on ports, and call centres on ICT infrastructure. All subsectors tend to rely on access to energy.

More technology-intensive service opportunities place greater emphasis on human capital endowments and technology adoption. We will treat these conditions in the Screen 3 of the framework, looking at future opportunities.

2.2 Methodology

In this chapter, we will outline a simple evaluation framework, involving three screens, listed below. The first two look at 'what exists' in SIDS, which frames the forward-looking third screen. Screen 3 captures the publication's research objective, namely identifying alternative development strategies for SIDS.

- How do SIDS' endowment structures compare with the prerequisites for the profiled economic development strategies? (Screen 1)
- How are SIDS' economies structured, as compared to the profiled economic development strategies? (Screen 2)
- How are SIDS positioned to capitalise on future opportunities for structural transformation, in the context of global value chains and the Fourth Industrial Revolution? (Screen 3)

2.2.1 Screen 1: Endowment structures

The descriptions of the development strategies listed above identify the key endowments, inputs and/or conditions required to pursue each strategy. In this first screen, we will screen SIDS against each of these endowments.

For all three screens, we will use proxy indicators for each endowment, input or condition. We identify the proxy indicators below.

The critical endowments for each of the development strategies and its variants are:

Manufacturing-led industrialisation

- Labour force
- Capital stock
- Domestic market size

Natural resource-led industrialisation

- Agricultural commodities variant: agricultural land
- Extractive commodities variant: reserves of natural resources (e.g. minerals, timber, oil or natural gas)

- Blue economy variant: ocean area and coastal distance

Service-driven development

- Labour force
- Access to basic infrastructure

Below are the proxy indicators we use to represent the endowments identified in the previous subsection and against which we will screen the SIDS.

Table 2.1 Indicators for Screen 1

Endowment or stock	Proxy indicator	Commentary
Labour force	Labour force	As an input for manufacturing and service industries, especially when targeting those with a higher intensity of capital and technology, labour is perhaps better represented as 'human capital', accounting for the education- and skill-related variables that contribute to productive workers in these industries. For the purposes of this initial screen, we have chosen to use the more basic indicator of 'labour force', since we will consider human capital in a later screen related to future opportunities.
Capital stock	Gross capital formation (US$)	The endowment of accumulated capital stock is ideally expressed as the stock variable 'total capital stock'. In this case, there exists no comprehensive dataset of estimates of total capital stock across all SIDS and developing countries. Since total capital stock is the sum of annual net additions to a country's physical capital stock, we have used the flow variable of annual gross capital formation as a proxy for 'total capital stock'.
Agricultural land	Agricultural land area	Agricultural land includes both land suitable for planting crops (arable land) and pastureland for raising livestock. Cash and staple crops are the more common bases for agriculture-led development strategies, but we have used the broader measure of agricultural land.
Ocean area and coastal distance	Capture fisheries production	Although, in practice, fisheries are one of the main subsectors in the development of most countries' 'blue economy', the concept is meant to include other subsectors such as tourism, transport and renewable energy. As a result, a country's endowment of ocean area and coastal distance is the ideal stock variable, expressed, for example, as the total square kilometres of its exclusive economic

(*Continued*)

Table 2.1 Indicators for Screen 1 (*Continued*)

Endowment or stock	Proxy indicator	Commentary
		zone (EEZ) and total kilometres of coastline. No. comprehensive dataset exists for either variable. Under the United Nations Convention on the Law of the Sea of 1982, many countries have declared the limits and area of their EEZs. But not all countries are able to map and declare their EEZs. We have therefore used the narrower fisheries endowment as a proxy. In the absence of comprehensive data on the stock variable of fisheries biomass, we have used the flow variable of capture fisheries production as a proxy.
Reserves of natural resources	Total natural resource rents (% of GDP)	The endowment of natural resources is ideally expressed as the stock variable of total proven reserves of all mineral, timber, oil and natural gas deposits. No such comprehensive data exists, partly because of the high cost of exploration to prove reserves, and partly because, in practice, exploration goes hand in hand with extraction, i.e. examples are rare of proven reserves that remain undeveloped over time. We use therefore the flow variable 'total natural resource rents (% of GDP)' as a proxy indicator, indicating the relative scale of extraction, and therefore the proven reserves that underpin these activities.
Domestic market size	GDP per capita	For firms selling products and services, domestic sales complement exports. Domestic market size is therefore an important indicator of the purchasing power of local consumers to afford their product or service. In the absence of comprehensive data on domestic or consumption market sizes in SIDS, we use GDP per capita as a proxy for this purchasing power.
Access to basic infrastructure	Share of population with access to electricity	Basic infrastructure can include hard infrastructure, or the physical structures necessary to deliver, for example, communications, energy, transportation and utilities services. Soft infrastructure includes the institutions and programmes that deliver, for example, cultural, education and health services. For our framework, 'basic infrastructure' refers mainly to hard infrastructure. Among the different types of hard infrastructure, we chose energy as the most common prerequisite for the economic development strategies treated in this publication, with access to electricity as the proxy indicator.

2.2.2. Screen 2: Economic structure

Based on their endowments, SIDS have endeavoured to develop their economies through specific sectors and subsectors. In this section, we profile the existing structure of the economy, as an input for the following screen, which looks at how SIDS are positioned to pursue future opportunities.

Table 2.2 Indicators for Screen 2

Element	Proxy indicator	Commentary
Sectoral distribution of inputs	Employment by sector, % of total	Sectoral distribution of inputs – or factors of production – includes both labour and capital. For simplicity, we chose to use employment by sector as a proxy, since capital investments are often devoted to improving labour productivity, as one of the main channels for structural transformation.
Sectoral distribution of outputs	Value-added by sector, % of total	Outputs by sector can be measured at several difference levels: for example, in terms of contribution to GDP, total value-added or total exports. They can also be expressed by quantity or value. Since our analysis aims at structural transformation, we chose to use the share in total value-added, since this indicator captures higher productivity activities.
Participation in trade	Trade-to-GDP ratio	All modern economic development strategies rely, to some degree, on trade – whether to access export markets or import inputs. Due to their geographic isolation and small economies, SIDS are particularly dependent on trade. Trade-to-GDP ratio is an effective indicator of the importance of trade to a country's economy. We have also presented the export and import channels of the total trade ratio, to understand how SIDS use trade relative to other countries.

2.2.3 Screen 3: Positioning to capitalise on future opportunities

Structural transformation relies on improvements in productivity that allow factors of production – especially capital and labour – to be devoted to higher-value activities. Economic theory emphasises the importance of manufacturing in this process, since it has a greater propensity than primary or service industries to absorb productivity-enhancing technologies and innovations in physical and human capital. The success of the export-led manufacturing strategies followed by the so-called East Asian 'miracle economies', and then China, has largely validated the importance of manufacturing in economic development (Kaldor, 1967; Kuznets, 1966; Birdsall et al., 1993).

Nevertheless, the landscape for manufacturing-led development has changed considerably in the last 30 years, with consequences for developing countries seeking to achieve structural transformation through this strategy. With globalisation,

Table 2.3 Indicators for Screen 3

Driver	Proxy indicator	Commentary
Investment capital	Gross savings rate Net FDI inflows	In Screen 1, we looked at capital stock through the proxy indicator of gross capital formation. In this screen, we are looking more generally at the capital flows available for investments in new industries, selecting gross savings rate as a proxy indicator for available domestic capital and FDI inflows.
ICT capabilities	Proportion of population using internet	For this screen, a flow variable such as 'ICT investments' would have been an ideal proxy indicator. In the absence of available data on ICT investments, we chose the more general proxy indicator of the proportion of the population using the internet.
Research and development (R&D)	Research and development expenditures	Research and development is an important prerequisite for establishing competitive new industries. Although data on this topic is relatively scarce among SIDS, we included it nonetheless, due to its importance.
Human capital	Government expenditure on education Tertiary enrolment rate	Opportunities in industries with higher labour productivity require a workforce with a higher overall skill level. In particular, these opportunities demand a workforce trained in the specific skills required by the industry. Achieving the required quality of training and quantity of trainees requires a significant investment over time. We chose to use government expenditures on education as a proxy indicator of human capital investments, with tertiary enrolment rate as a proxy indicator for the number of skilled graduates a country produces.
Innovation	Total patent applications	For this driver, the World Intellectual Property Organization's (WIPO) Global Innovation Index[2] would have been an ideal proxy indicator, since it is composed of approximately 80 sub-indicators. But the index includes too few SIDS for our analysis, so we selected total patent applications as the proxy indicator.
Institutional quality	Regulatory quality index	For institutional quality, we chose the regulatory quality subindex – one of six subindices of the Worldwide Governance Indicators (WGI)[3] dataset. Several of the WGI subindices would have served as a proxy indicator – we chose regulatory quality for its relevance to the competitiveness of a new industry.

advances in transportation and, especially, communications technologies, have allowed transnational corporations to coordinate more complex global value chains, locating increasingly disaggregated productive activities in the most advantageous jurisdictions around the world.

Extending the transformations caused by globalisation, advancements in computing have transformed methods of production in many industries. Robotics, automation, artificial intelligence, nanotechnology and the 'internet of things' are steadily being integrated into the management and operations of productive activities. This so-called Fourth Industrial Revolution enhances labour productivity, even as, in many cases, it implies stagnant or even lower levels of employment (UNCTAD, 2017).

For developing countries, while the Fourth Industrial Revolution may represent new opportunities to participate in global value chains and trade (WEF, 2018), it also presents significant barriers to entry, with requirements for connectivity, infrastructure and highly skilled workers that are difficult to achieve for many poor countries (Hallward-Driemeier and Nayyar, 2017; Crosby et al., 2016). The Fourth Industrial Revolution therefore risks widening inequalities between, on the one hand, innovators and early adopters and, on the other, those who are lagging behind, whether across countries or among individuals within each country.

New opportunities in global value chains and the Fourth Industrial Revolution rely on some of the same conditions and prerequisites as previous generations of manufacturing or service industries. Nevertheless, these new opportunities differ by placing a much greater emphasis on an economy or firm's ability to innovate and adapt to a rapid pace of technological change. With this in mind, we favoured flow variables that speak to innovation, change and adaptation in our selection of proxy indicators for this screen.

2.2.4 Indicators and sources

To the degree possible, we chose proxy indicators that: a) best illustrate the endowments, elements and drivers in the three evaluation screens; and b) offer sufficient data points for a meaningful comparison. Since the first two screens use broader, established indicators, coverage was relatively wide, with well over half of the SIDS represented for each indicator.

In the third screen, we use more recent and detailed indicators, for which data coverage was sparser. As a result, three of the eight indicators used in screen 3 had values for fewer than half of SIDS: government expenditures on R&D (n=6), tertiary enrolment rates (n=15) and total patent applications (n=14). In these cases, we used these indicators for lack of suitable alternatives with better data coverage. Annex 3 presents the list of proxy indicators and sources that we used in this framework, including the number of SIDS data points for each one.

2.2.5 Sample

We applied our evaluation framework to a sample of 37 SIDS, essentially the UN-OHRLLS list of 38 United Nations member states (see Annex 1), minus Singapore.

We arrived at the sample for our evaluation after conducting a sensitivity analysis on three potential sample lists of SIDS, namely:

a. the full UN-OHRLLS list of 38 SIDS (not selected);

b. the UN-OHRLLS list, minus Singapore, of 37 SIDS (selected); and

c. the UN-OHRLLS list, less high-income countries,[4] of 20 SIDS (not selected).

Our sensitivity analysis for these three groups showed that results for group (a) were often significantly skewed by outliers, often high-income SIDS and mainly Singapore. For several indicators, the resulting average values tended to outperform the threshold, despite most countries in the sample falling below.

Removing the 18 high-income countries in the group (c) list corrected nearly all the skewness observed in group (a) results. However, it also diminished the representativeness of the sample, for example by removing most of the Caribbean and Indian Ocean SIDS, many of them small-island states, and leaving an overrepresentation of Pacific SIDS.

In the end, we opted to remove just Singapore from the full list of SIDS, to give a sample of 37 countries. This group preserved the regional representativeness of the group, while still correcting much of the skewness observed in the group (a) results.

2.2.6 Thresholds

As thresholds, we evaluated the sample of SIDS against four groups of countries that follow the economic development strategies that framed our evaluation namely:

- Manufacturing-led industrialisation
- Natural resource-led industrialisation
    - Agricultural variant
    - Extractive variant
- Service-led development

For the first three strategies, we used existing trade-based country groupings compiled by UNCTAD Statistics. Annex 4 provides the full lists of countries in each group and Table 2.4 provides a summary.

As there exists no similar group of countries for service-led economies, the authors compiled a list of the 17 economies with the highest average ratio of trade in services, as a percentage of GDP, from 2005 to 2019. The full list of countries in this group is included in Annex 4.

The composition of the four threshold groups was appropriate for our purposes, returning average values that, in general: a) reflected well the four development strategies we wanted to illustrate; and b) contained few outliers and a regular distribution of values. The presence of China in the MAN group was perhaps the only exception, due to the large size of its land area, population and economy, relative to the rest of the group. For example, for the proxy indicators in screen 1 for gross

Table 2.4 Country groupings for evaluation thresholds

Economic development strategy	Representative group of countries		Countries
	Name (source)	Code	
Manufacturing-led industrialisation	Selected exporters of manufactured goods (UNCTAD)	MAN	16
Natural resource-led industrialisation			
Agriculture variant	Selected exporters of agricultural products (UNCTAD)	APE	25
Extractive variant	Selected exporters of minerals and metals (UNCTAD)	MME	16
Service-led development	Selected exporters of services (authors' list)	SER	17

capital formation, agricultural land area and capture fisheries production, China's values were an order of magnitude larger than those of the other countries in the MAN group. For the total labour force indicator, both China and India had values considerably larger than the rest of the group.

Despite its enormous weight in the average value for the MAN group for these four indicators, we chose to keep China in the group for our calculations. China is a benchmark for manufacturing-led industrialisation and the scale of the factors of production at its disposal represents well how difficult it is to compete with China's scale in the manufacturing sector, for SIDS or other developing countries.

We arrived at our four threshold groups after conducting a sensitivity analysis that compared results with other potential threshold groups, primarily the middle-income countries (MICs) and, to a secondary degree, the least-developed countries (LDCs). After all, nine SIDS are also classified as LDCs and many of the 37 SIDS in our sample aspire to middle-income status.

Nevertheless, neither the MIC nor LDC groups represented effective thresholds for our evaluation of SIDS. From a conceptual perspective, our evaluation framework is built on the different prerequisites for the profiled economic development strategies. In general, income is one of these prerequisites, but is, by itself, insufficient to differentiate among them. From a results perspective, averages for the heterogeneous MIC group were too similar to provide an effective comparison and path forward for countries in the SIDS group – itself also quite heterogeneous. Although we compiled results for the LDC group, they served more as a secondary comparison, being typically lower in all cases than the average values for the SIDS group, and therefore were of little value as a benchmark or way forward for SIDS.

2.3 Results

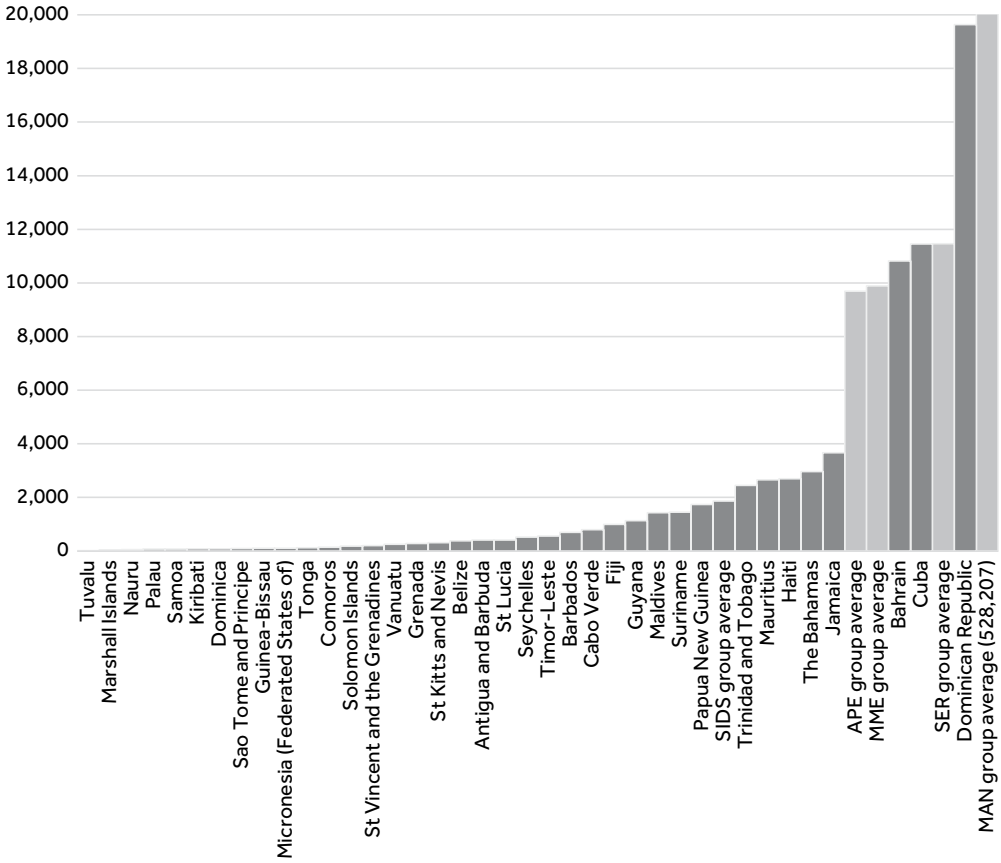
2.3.1 Screen 1 – Endowment structure

For the indicators we selected to represent ***total labour force*** and ***agricultural land***, no SIDS approached the average values for the groups of selected exporters of

manufactures (MAN), minerals and metals (MME), or agricultural products (APE). A handful of SIDS had higher values than the group of selected exporters of services (SER).

We observed similar results for ***capital stock***, with gross fixed capital formation as the indicator. In this case, the MAN group average of US$528 billion far outstripped the highest SIDS values – Dominican Republic (US$19.6 billion), Cuba (US$11.5 billion) and Bahrain (US$10.8 billion) – which were the only ones to exceed the APE and MME group averages. As illustrated in Figure 2.1, only Dominican Republic exceeded the SER group average of US$11.5 billion.

Figure 2.1 Gross fixed capital formation, current US$ millions (2018)



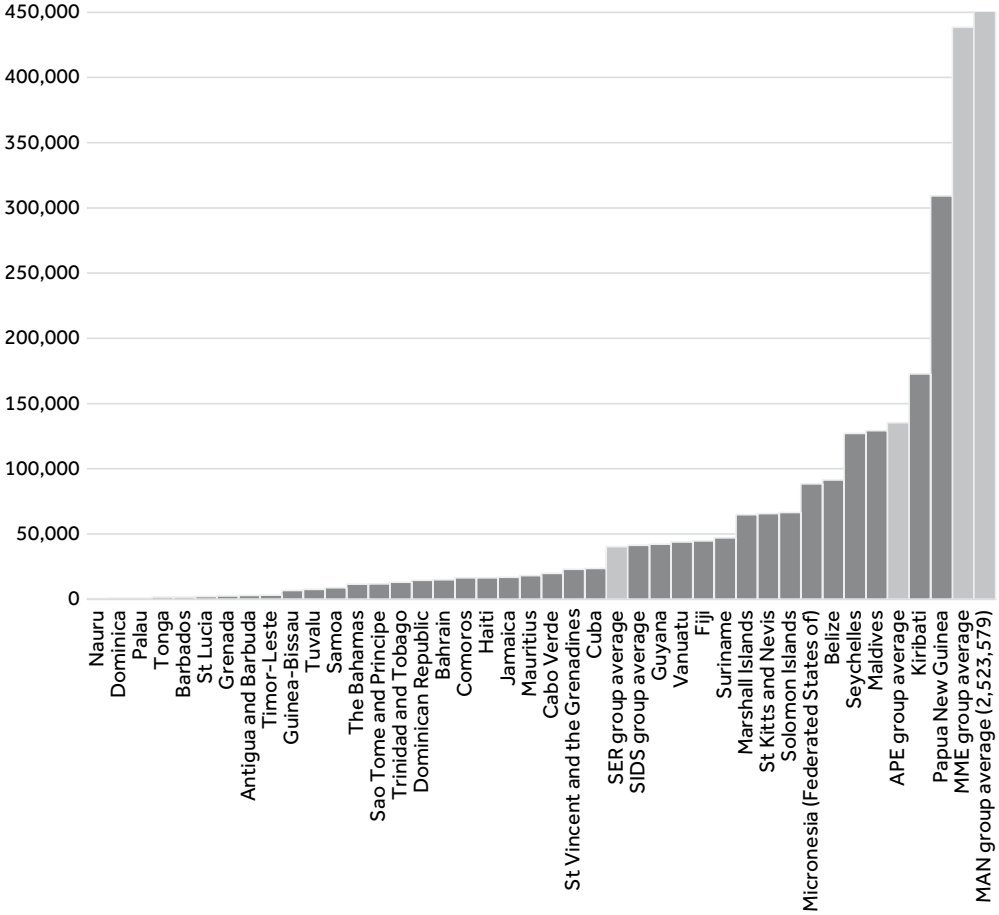
Source: UNCTAD.

These results underline that the smallness of SIDS' land area, population and economies preclude them adopting economic development strategies based on abundant factors of production – labour, capital and land.

For the ***ocean area and coastal distance*** endowment, our proxy indicator of capture fisheries production again returned a significant difference in scale between the MAN group average value of approximately 2.5 million metric tonnes (MT) and the

MME group average of 438,000MT and the closest SIDS – Papua New Guinea, at a little more than 300,000MT. As shown in Figure 2.2, capture fisheries production in nearly all SIDS was considerably less than the averages for the MAN, MME and APE groups of countries.

Figure 2.2 Capture fisheries production, MT (2018)

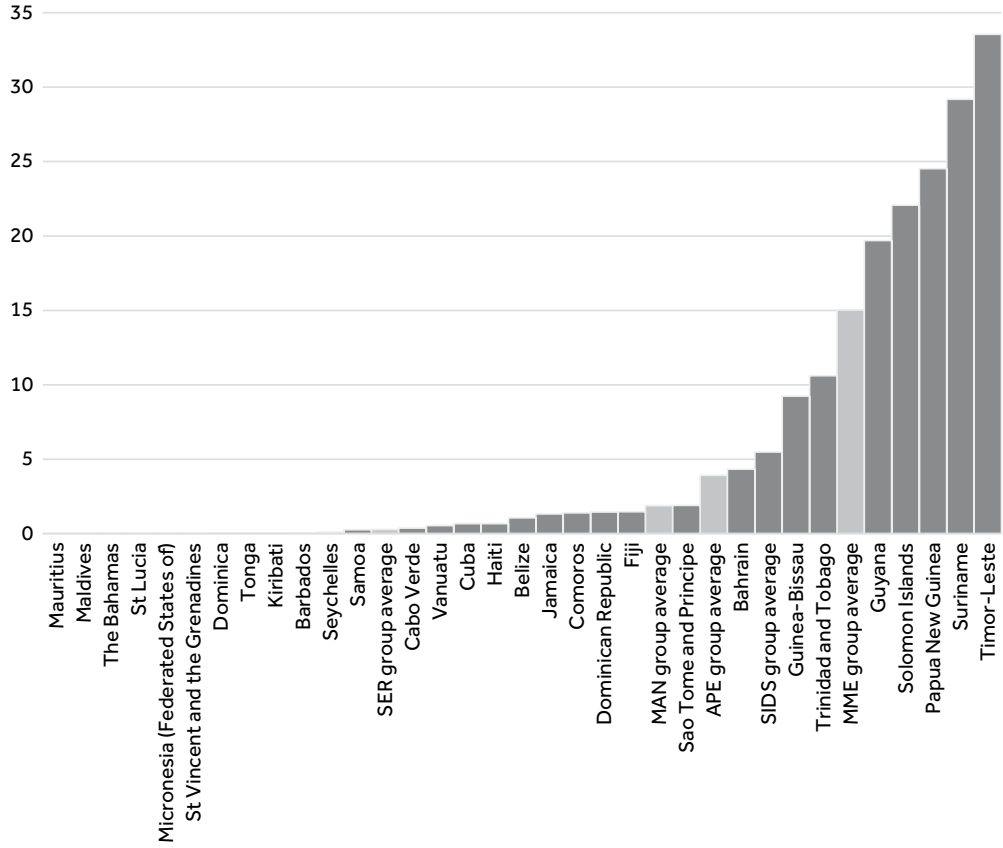


Source: World Bank.

Nevertheless, since we emphasise in this publication that blue economy strategies should be broader than just fisheries, we reflect that fisheries production may not be a representative indicator for the ***ocean area and coastal distance*** endowment and that further work is required to compile a better indicator and dataset, such as EEZ area.

Reserves of natural resources, with its relative proxy indicator – natural resource rents as a percentage of GDP – gave a more nuanced comparison. As shown in Figure 2.3, five SIDS – Timor-Leste, Suriname, Papua New Guinea, Solomon Islands and Guyana – relied on natural resources for approximately 20–34 per cent of their GDP, more than the MME group average of 15 per cent. For a further three SIDS – Trinidad

Figure 2.3 Natural resource rents, % of GDP (2018)



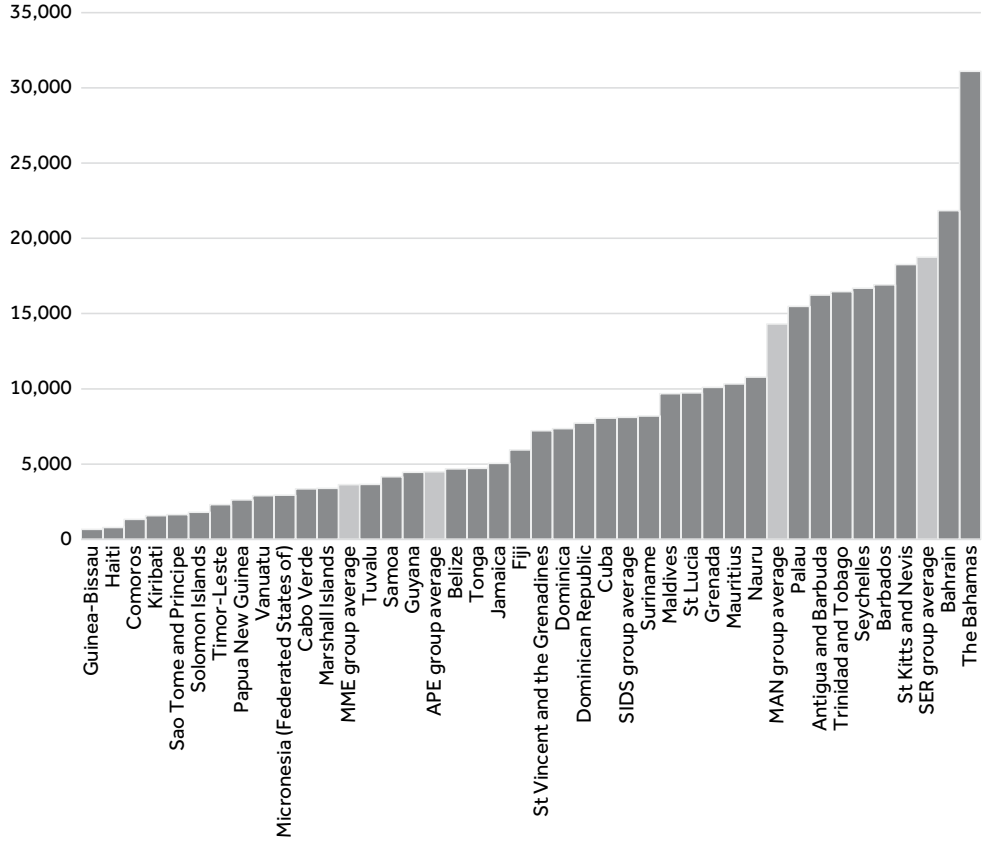
Source: World Bank.

and Tobago (11 per cent), Guinea-Bissau (9 per cent) and Bahrain (4 per cent) – the share of natural resource rents in GDP was greater than the averages for both the APE and MAN groups. For the remaining 22 SIDS in the sample, it was below 2 per cent.

As our proxy indicator for ***domestic market size***, Figure 2.4 shows that eight SIDS, as well as the SER group average, had higher GDP per capita values than the MAN group average of approximately US$14,300. A further 14 SIDS had higher GDP per capita values than the APE group average of US$4,500 and 17 than the MME average of US$3,600. There are therefore a cross-section of SIDS of different sizes and economic structures with GDP per capita levels that suggest a minimum purchasing power to support local consumption.

Figure 2.5 shows that 24 SIDS in the sample had a greater proportion of their population with access to electricity than the MAN group average of 96 per cent, with 20 SIDS reporting 100 per cent access. Access to electricity therefore relates a positive story for ***access to basic infrastructure***. Further study can establish whether residents of these countries have comparable access to other forms of basic infrastructure, for example, internal transport and trade infrastructure. For the purposes of this

Figure 2.4 GDP per capita, constant 2015 US$ (2018)



Source: UNCTADStat.

publication, this indicator suggests that access to basic infrastructure is a comparative advantage for many SIDS, relative to other developing countries.

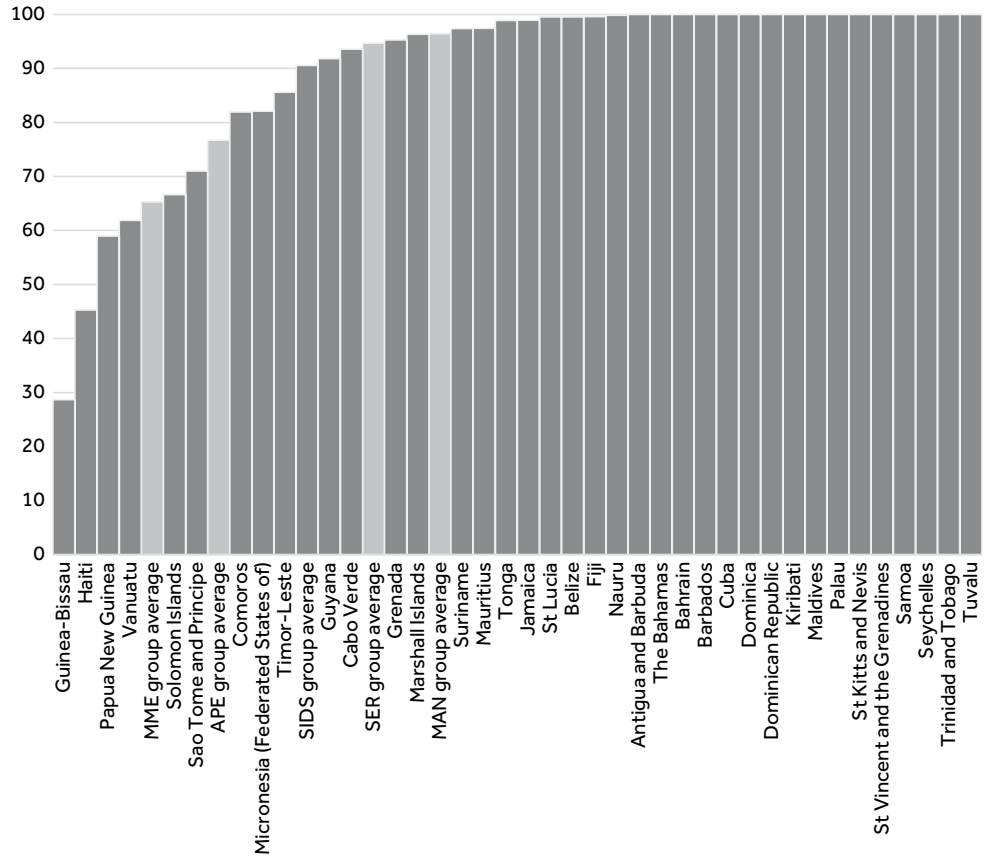
Table 2.5 summarises the results for the seven indicators, as described in the previous paragraphs.

Table 2.6 groups the same indicators in terms of the prerequisites identified for each of the selected development strategies. This analysis suggests that, apart from those SIDS endowed with extractive resources, the endowment structure in most SIDS does not provide a comparative advantage in the three common development strategies, as we have defined them. This is due mainly to the lack of economies of scale in the availability of factors of production: land, labour and capital.

2.3.2 Screen 2 – Existing economic structure

To evaluate the existing economic structure in SIDS, we began by comparing the allocation of inputs and outputs among the primary, secondary and tertiary sectors

Figure 2.5 Access to electricity, % of population (2018)



Source: Sustainable Energy for All (SE4ALL) database.

in SIDS with the averages for the four threshold groups. We used employment as the proxy indicator for inputs and value-added for outputs.

Table 2.7 shows the group averages for the two indicators, sorted by the respective shares in the tertiary sector and the highest share in each sector in italics. Overall, the highest shares of both inputs and outputs by sector correspond with the economic development strategy around which each group is compiled, that is: SER in the tertiary sector, MAN in the secondary and MME in the primary.

In general, SIDS had a lower proportion of jobs in the primary and secondary sectors, with more in the tertiary sector, albeit less than the SER group average.

The figures in Table 2.7 also offer some insight on labour productivity in the different groups. For example, three groups (SER, SIDS and MAN) had a ratio of value-added to employment of greater than one in the tertiary sector. By contrast, three of the groups (SER, SIDS and MME) had a ratio of less than one in the primary sector. In the secondary sector, two of the groups (APE and MME) had ratios greater than one and the other two groups a ratio of less than one.

Table 2.5 Summary of screen 1 proxy indicators

#	Endowment or stock	Proxy indicator	Unit	SIDS (n / 37)	Threshold group averages				# of SIDS exceeding MAN average
					SER	APE	MME	MAN	
1.1	Labour force	Total labour force	Persons, thousands	26	1,008	8,573	5,955	108,778	0
1.2	Capital stock	Gross capital formation	US$ millions (current)	37	11,464	9,695	9,894	528,207	0
1.3	Agricultural land	Agricultural land area	1,000 ha	37	207	17,111	23,043	62,166	0
1.4	Ocean area and coastal distance	Capture fisheries production	MT	37	40,248	135,352	438,473	2,523,579	0
1.5	Reserves of natural resources	Total natural resources rents (% of GDP)	% of GDP	30	0	4	15	2	9
1.6	Domestic market size	GDP per capita	US$ (constant 2015)	37	18,743	4,483	3,628	14,314	8
1.7	Access to basic infrastructure	Share of population with accesses to electricity	% of population	37	95	77	65	96	24

Table 2.6 Screen 1 indicators by development strategy

Strategy / variant	Prerequisite	Relevant threshold group	# of SIDS exceeding threshold
Manufacturing-led industrialisation			
	Surplus labour force	MAN	0
	Capital stock	MAN	0
–	Domestic market size	MAN	8
Natural resource-led industrialisation			
Agriculture	Agricultural land	APE	0
Extractives	Natural resource reserves	MME	5
Service-based development			
	Surplus labour force	SER	0
	Access to basic infrastructure	SER	24

Table 2.7 Average economic structure of SIDS and threshold groups

#	Flow	Proxy indicator	Unit	Group average	Primary	Secondary	Tertiary
2.8	Inputs	Employment by sector	%	SER	18.0	14.2	***67.8***
				SIDS	25.5	15.5	59.0
				MAN	22.5	***23.1***	54.4
				APE	37.5	14.1	48.5
				MME	***40.3***	12.4	47.3
2.9	Outputs	Value-added by sector	%	SER	13.4	12.3	***74.3***
				SIDS	23.2	14.2	62.6
				APE	32.2	15.9	51.8
				MAN	28.2	***21.4***	50.4
				MME	***36.8***	16.4	46.8

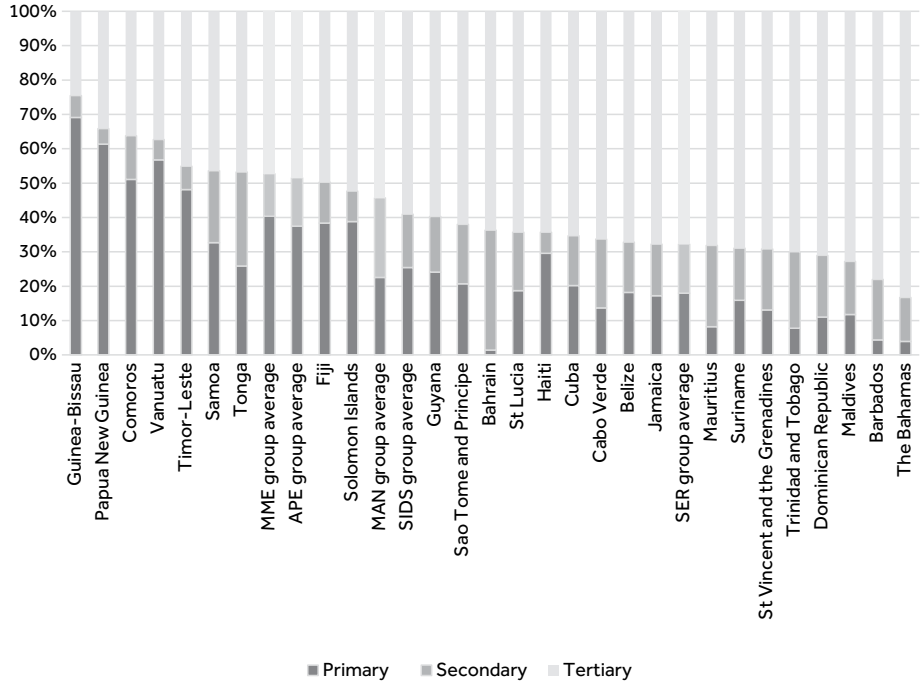
Source: International Labour Organization (ILO) (employment), United Nations, National Accounts Estimates of Main Aggregates (value-added).

Looking more closely at the individual indicators, Figure 2.6 illustrates employment by sector for 26 SIDS, compared to the four threshold group averages. By sector, the chart shows that, relative to the threshold group averages:

- 19 SIDS (73 per cent of the sample) had less employment in the primary sector than the APE and MME group averages;
- all but three SIDS (Bahrain, Mauritius and Tonga) had less employment in the secondary sector than the MAN group average of 23.1 per cent; and
- relative to the SER group average, eight SIDS had a higher share of employment in the tertiary sector and 18 a lower share.

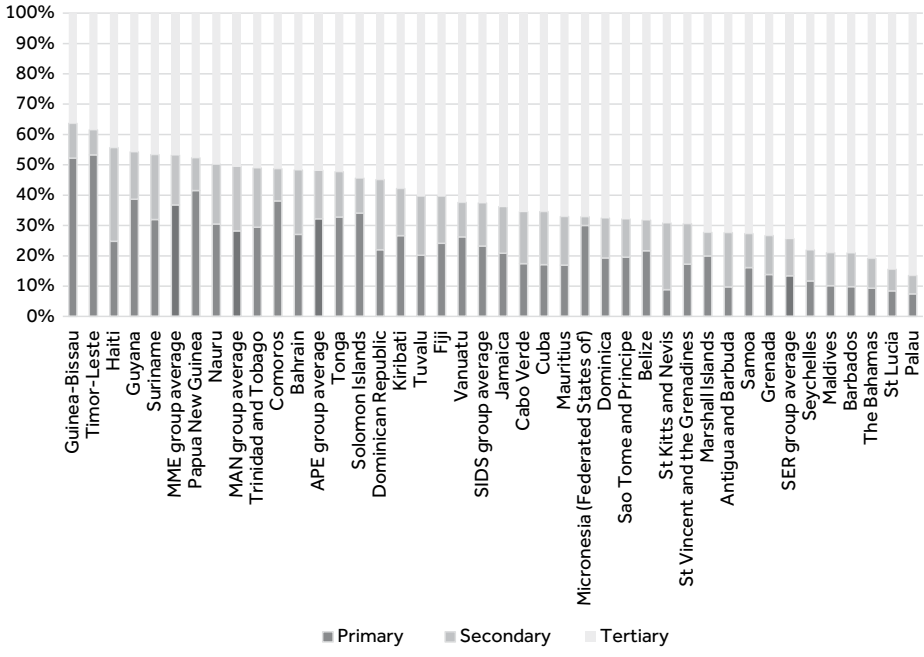
Figure 2.7 depicts value-added by sector for 37 SIDS and the group averages. The comparison with the threshold groups is similar to the employment figures:

Figure 2.6 Employment by sector, % of total (2018)



Source: ILO.

Figure 2.7 Value-added by economic sector, % of total (2018)



Source: United Nations, National Accounts Estimates of Main Aggregates.

- 30 SIDS (81 per cent of the sample) generated less value-added in the primary sector than the APE and MME group averages;
- all but four SIDS (Dominican Republic, Haiti, St Kitts and Nevis, and Suriname) had a lower share of value-added in the secondary sector than the MAN group average; and
- relative to the SER group average, six SIDS (The Bahamas, Barbados, Maldives, Palau, St Lucia and Seychelles) had a higher share of value-added in the tertiary sector and 31 had a lower share.

A high dependence on trade is another defining characteristic of many SIDS economies. As shown in Table 2.8, relative to the threshold groups, the average trade-to-GDP ratio in SIDS (97.3) was below that SER (165.9) and MAN (122) groups, but above the MME and APE groups. This order remained intact for both the export and import channels. Similarly, imports represented a greater share than exports in total trade for all but the MAN group.

Figure 2.8 illustrates the trade-to-GDP ratio for 26 SIDS and the threshold group averages, with only five SIDS (Bahrain, Maldives, Marshall Islands, Palau and Seychelles) reporting a higher total ratio than the MAN group average, and only Seychelles with a higher ratio than the SER group average. Eleven (11) SIDS reported a higher imports-to-GDP ratio than the MAN group average, while only three (Bahrain, Maldives and Seychelles) did on the export side.

In Screen 1, we observed that the endowment structures in SIDS are not well suited to large-scale, manufacturing-led industrialisation strategies. Sixteen (16) SIDS had greater extractive resource endowments than the MME group average, suggesting their suitability for natural resource-led industrialisation strategies. Meanwhile, 24 SIDS were better suited to service-led development strategies.

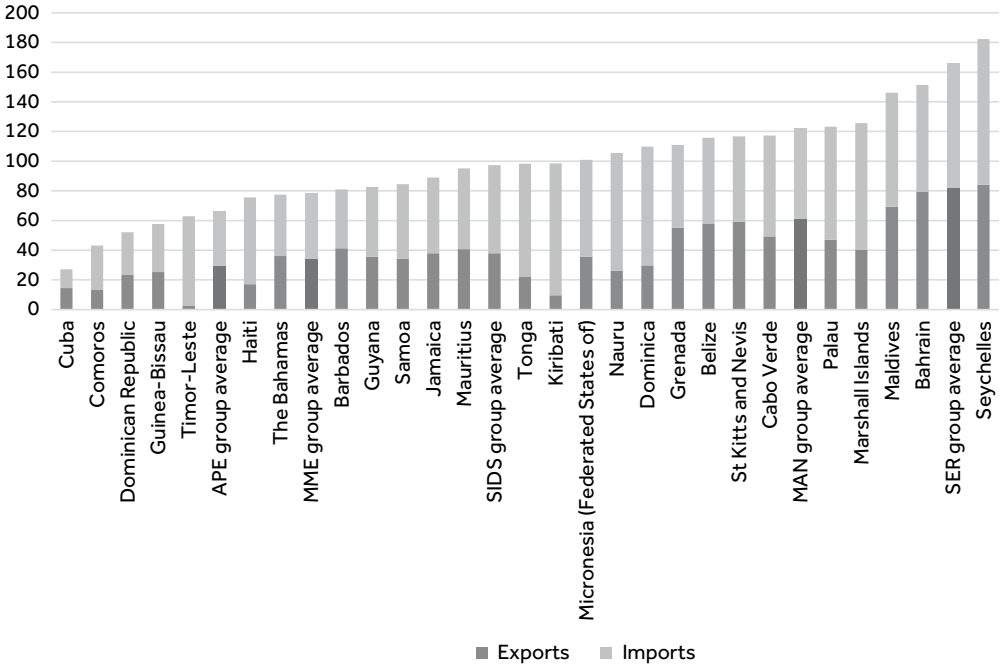
Among the 16 SIDS suited to natural resource-led strategies, Screen 2 illustrated that the economic structure in five of them – the Comoros, Guinea-Bissau, Guyana, Papua New Guinea and Timor-Leste – closely matched their endowments and exceeded the MME group average. Another six – the Federated States of Micronesia, Nauru, Solomon Islands, Suriname, Tonga, and Trinidad and Tobago – had comparable shares of value-added in their primary sectors, even if they were just below the MME group average.

Table 2.8 Average trade-to-GDP ratio in SIDS and MICs (2018)

#	Flow	Proxy indicator	Unit	Group average	Exports	Imports	Total trade
2.10	Trade	Trade-to-GDP ratio	%	SER	81.9	84.0	165.9
				MAN	61.2	60.8	122.0
				SIDS	38.0	59.4	97.3
				MME	34.0	44.1	78.1
				APE	29.6	37.1	66.7

Source: World Bank and OECD national accounts data.

Figure 2.8 Trade as a percentage of GDP (2018)



Source: World Bank and OECD national accounts data.

Among the 24 SIDS suited to service-led strategies, the economic structure in six – The Bahamas, Barbados, Maldives, Palau, St Lucia and Seychelles – matched their endowments, with roughly equivalent shares of employment and value-added in the tertiary sector that exceeded the SER group averages. Another 13 SIDS were within 10 per cent of the SER group average, underlining the general importance of the tertiary sector among this group of countries.

Four SIDS had economic structures that did not mirror their endowments:

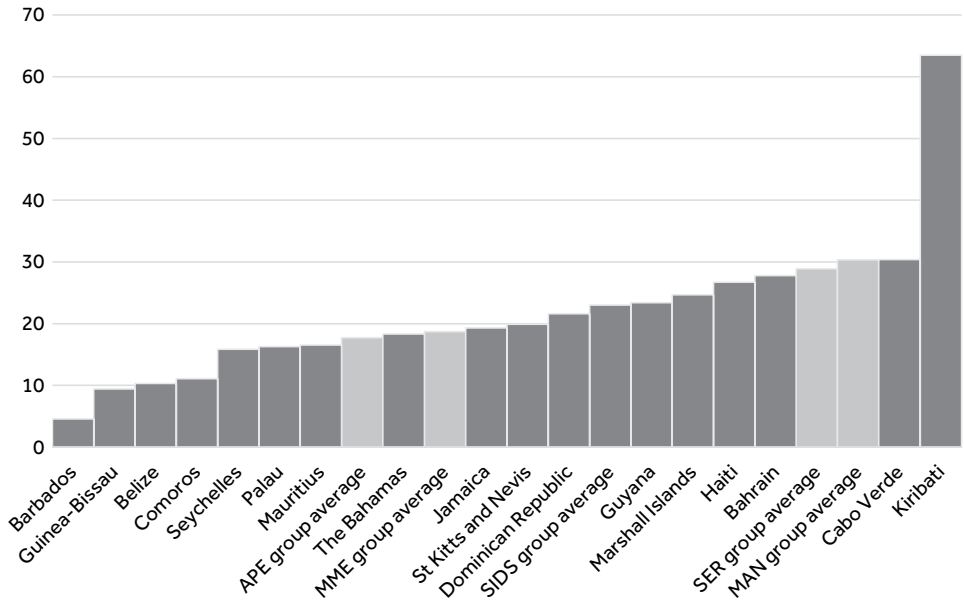
- Dominican Republic, St Kitts and Nevis, and Suriname fit the above patterns relatively well, but had a higher share of value-added in their secondary sectors than the MAN group average; and
- Haiti's endowments pointed towards a service-led strategy; however, in the SIDS group, it had the highest share of value-added in the secondary sector (30.9 per cent) and among the lowest in the tertiary sector (44.3 per cent).

3.3.3 Screen 3 – Drivers for future opportunities

In Screen 3, we evaluated the 37 SIDS according to eight forward-looking attributes that could position them for future opportunities. The chosen proxy indicators included six flows that yield future benefits – such as investments, patent applications and government expenditures in key areas – and two indicators for ICT utilisation and institutional quality.

We included in our evaluation two proxy indicators for available investment capital – gross savings rate and net FDI inflows. Figure 2.9 shows the average gross savings rates from 2014 to 2018 for 19 SIDS and the threshold group averages. Only two SIDS – Cabo Verde and Kiribati – had higher gross savings rates than the SER and MAN group averages. Another eight SIDS had savings rates above the MME and APE group averages.

Figure 2.9 Gross savings rate, % of GDP, five-year average (2014–18)



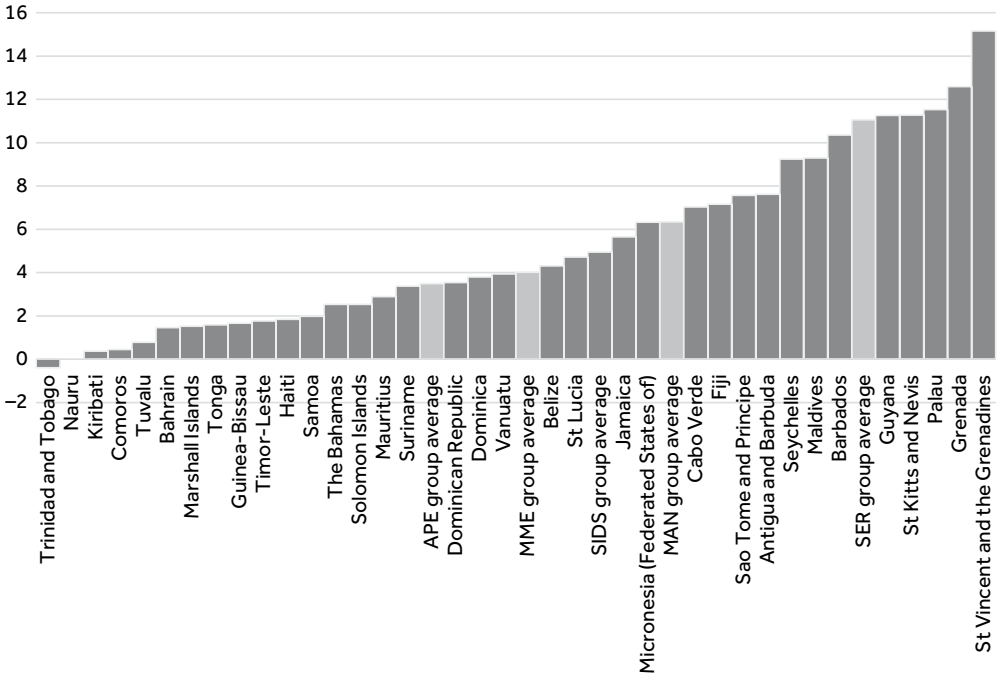
Source: World Bank and OECD national accounts data.

Figure 2.10 depicts the second proxy indicator for available investment capital: net FDI inflows, as a percentage of GDP over the period 2014–18, for 36 SIDS and the group averages. Five SIDS – Grenada, Guyana, Palau, St Kitts and Nevis, and St Vincent and the Grenadines – had higher relative FDI inflows than the SER group average, while a total of 12 had higher values than the MAN group average.

As a proxy indicator for ICT utilisation, Figure 2.11 shows the proportion of the population using the internet in 2017 for 34 SIDS and the group averages. Five SIDS in the sample – The Bahamas, Bahrain, Barbados, Dominican Republic, and St Kitts and Nevis – had higher internet penetration rates than the SER and MAN group averages, with the bulk of the remaining SIDS falling somewhere between the SER/MAN and APE/MME averages.

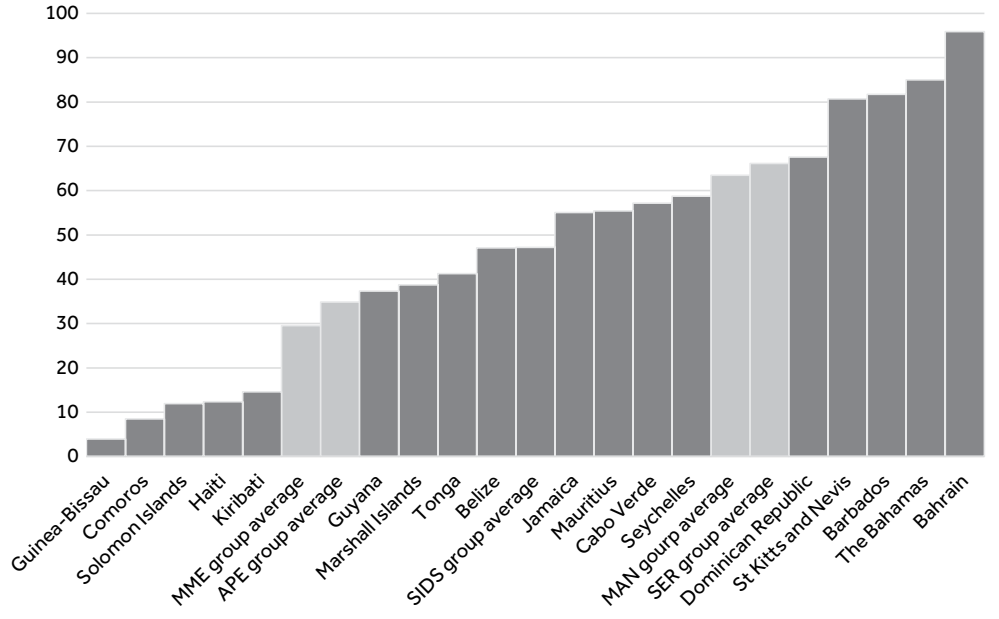
Figure 2.12 shows average government research and development expenditures, as a percentage of GDP from 2014 to 2018. As mentioned in the methodology subsection (2.2), only six SIDS reported values for this indicator during the period, so its

Figure 2.10 FDI net inflows, % of GDP, five-year average (2014–18)



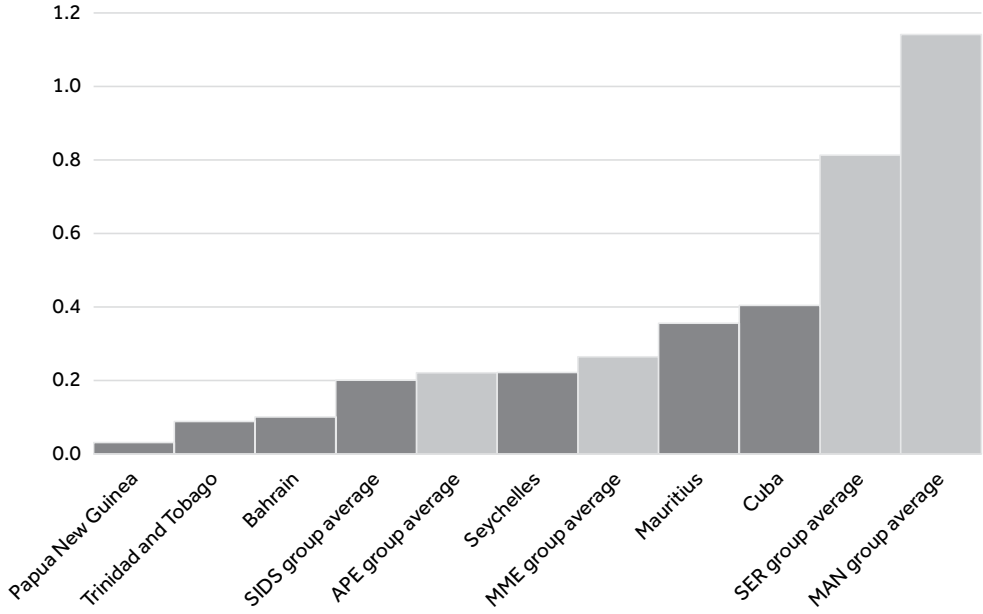
Source: IMF balance of payments databases, World Bank debt statistics and World Bank and OECD GDP estimates.

Figure 2.11 Proportion of population using internet, % (2017)



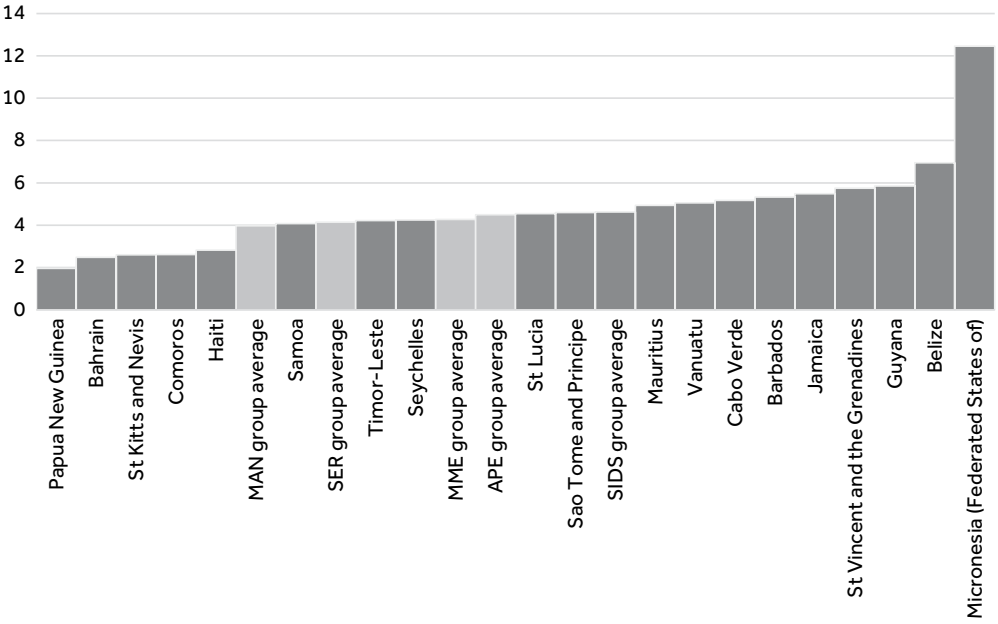
Source: ITU-ICT Indicators Database.

Figure 2.12 R&D expenditures, % of GDP, five-year average (2014–18)



Source: UN Educational, Scientific and Cultural Organization (UNESCO) Institute for Statistics.

Figure 2.13 Government expenditures on education, % of GDP, five-year average (2014–18)



Source: UNESCO Institute for Statistics.

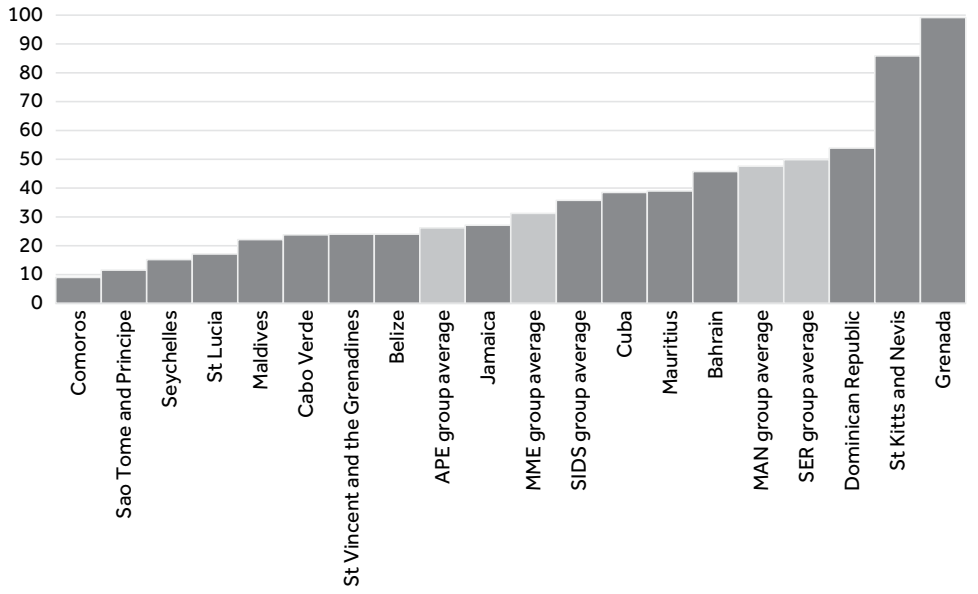
comparative value is limited. Nevertheless, R&D is an important driver of future opportunities, for which there are no alternative indicators with wider data coverage, so we include it here for illustrative purposes. None of the SIDS in the sample spent more than 0.4 per cent of GDP on R&D during the period, considerably less than the averages for the SER (0.8 per cent) and MAN (1.1 per cent) groups.

We included two proxy indicators for the important driver of human capital: government expenditures on education and tertiary enrolment rates. Figure 2.13 shows average government expenditures on education, as a percentage of GDP, over the 2014–18 period, for 22 SIDS and the group averages. Half of the SIDS in the sample (11) reported higher relative spending on education than the nearest threshold group average (APE). Of these, the average spending of 10 fell within the band of 4.5–7 per cent of GDP, whereas the Federated States of Micronesia reported an average of 12.5 per cent.

Figure 2.14 shows average tertiary enrolment rates, as a percentage of gross enrolment, for the 2014–18 period for 15 SIDS and the group averages. Only three SIDS – Dominican Republic, Grenada, and St Kitts and Nevis – had tertiary enrolment rates above the SER and MAN group averages over the period. The remainder of the SIDS values were clustered on either side of the APE and MME group averages.

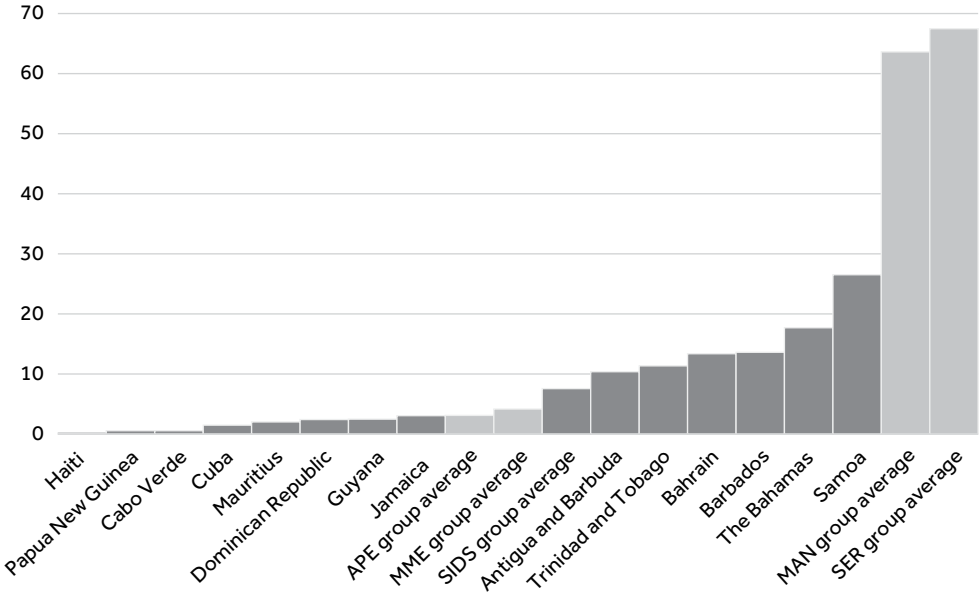
As a proxy indicator for innovation, Figure 2.15 depicts average total patent applications per 100,000 inhabitants from 2014 to 2018, for 14 SIDS and the group averages. The averages for the SER (67.5) and MAN (63.6) groups far outpaced the nearest SIDS, Samoa, with an average of 27. The remaining SIDS values were all below

Figure 2.14 Tertiary enrolment rate, % of gross, five-year average (2014–18)



Source: UNESCO Institute for Statistics.

Figure 2.15 Average total patent applications, # per 100,000 inhabitants (2014–18)



Source: WIPO (patent applications), World Bank (population).

20 patent applications per 100,000 of the population, highlighting that the entire group lags considerably behind the benchmarks for manufacturing- and service-led strategies, on this indicator for innovation.

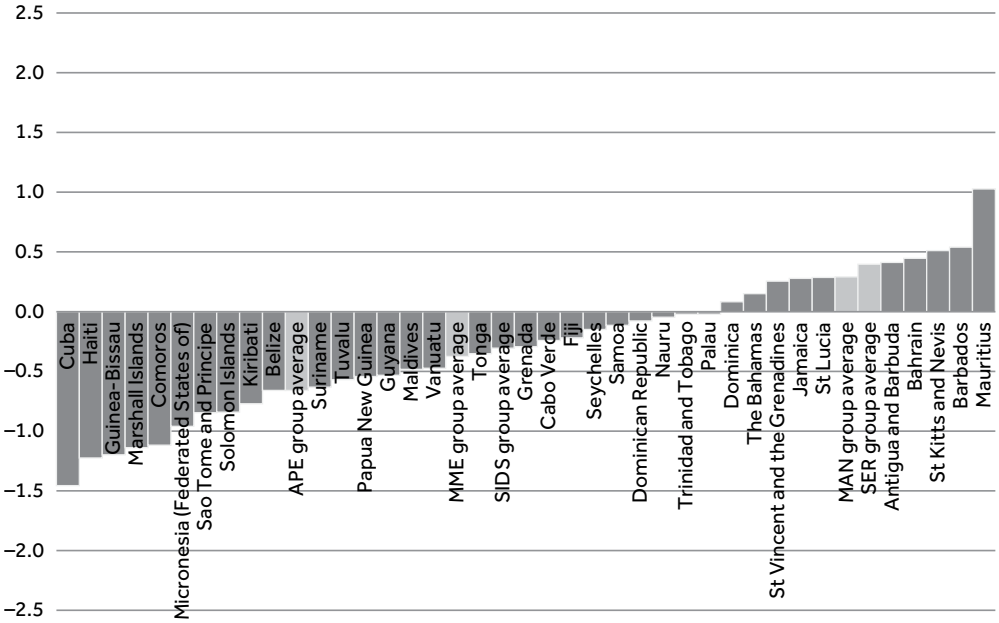
As a proxy indicator for institutional quality, Figure 2.16 depicts 2018 values of the regulatory quality subindex, from the Worldwide Governance Indicators (WGI) database, for 36 SIDS and the group averages. In its various subindices, the WGI scores countries along a scale from −2.5 for weak governance, to +2.5 for strong governance. The chart illustrates, for example:

- that five SIDS in the sample – Antigua and Barbuda, Barbados, Bahrain, Mauritius, and St Kitts and Nevis – have higher regulatory quality scores than the SER and MAN group averages;
- ten SIDS have regulatory quality scores above 0, three at exactly zero and 23 below; and
- the average score for the SIDS group is −0.3, underlining the need for improved governance in many SIDS.

Across the eight chosen proxy indicators in Screen 3, the SIDS group as a whole had mediocre scores relative to the threshold groups. For example:

- for seven of the eight indicators, the averages for the SER and MAN groups outperformed the SIDS and the other two threshold groups;

Figure 2.16 Regulatory quality index, −2.5 (weak) to 2.5 (strong) (2018)



Source: World Bank, Worldwide Governance Indicators

- for the same seven indicators, the SIDS group average fell below the SER/MAN averages and above the APE/MME averages; and
- the SIDS group had a higher average value than all four threshold groups only for government expenditures on education.

While these results suggest SIDS outperform other developing countries that rely on natural resource-led industrialisation strategies, i.e. the APE and MAN group of countries, they also show that SIDS lack a comparative advantage relative to the leading countries in the SER and MAN groups, for seven of the eight drivers of future opportunities. If SIDS want to be competitive in attracting opportunities in the context of the Fourth Industrial Revolution, these results offer some benchmarks for improvement.

2.3.4 Readiness for Frontier Technologies Index

For its upcoming 2021 *Technology and Innovation Report*, UNCTAD (2021) computed a Readiness for Frontier Technologies Index for 158 countries. The index is composed of nine indicators to illustrate the five following 'building blocks' for a country's readiness to innovate and adopt frontier technologies:

1. ICT deployment
2. Skills
3. R&D activity

4. Industry activity
5. Access to finance

The index scores countries from 0 (low) to 1 (high) for each building block and overall, from 2017 to 2019. The top-ranked countries for 2019 were:

1. United States of America (1.00)
2. Switzerland (0.97)
3. United Kingdom (0.96)
4. Sweden (0.96)
5. Singapore (0.95)

Based on their rank, the top 40 countries' readiness is classified as 'high', the following 40 'upper middle', the next 40 'lower middle' and the remainder as 'low'.

Although the index's scope, building blocks and underlying indicators differ, its overall concept and objectives parallel those of this publication's Screen 3 on 'drivers for future opportunities', presented in the previous subsection.

For comparison with this publication's results, therefore, Table 2.9 lists the total index scores for the 21 SIDS from our sample of 37 for which data were available, as well as their rank among the 158 countries included in the index.

Table 2.9 Readiness for Frontier Technologies Index 2019

SIDS	Total score	Rank	Category
Barbados	0.58	48	Upper middle
Bahrain	0.54	56	Upper middle
Trinidad and Tobago	0.45	75	Upper middle
Mauritius	0.45	77	Upper middle
The Bahamas	0.39	84	Lower middle
Fiji	0.37	88	Lower middle
Suriname	0.34	92	Lower middle
St Lucia	0.34	93	Lower middle
Dominican Republic	0.33	95	Lower middle
Jamaica	0.32	96	Lower middle
Belize	0.32	97	Lower middle
Cabo Verde	0.29	101	Lower middle
Guyana	0.27	108	Lower middle
Maldives	0.25	114	Lower middle
Papua New Guinea	0.23	119	Low
St Vincent and the Grenadines	0.22	120	Low
Sao Tome and Principe	0.12	140	Low
Comoros	0.10	142	Low
Timor-Leste	0.09	144	Low
Haiti	0.04	154	Low

Source: UNCTAD, 2021.
Note: Total score from 0 (low) to 1 (high), rank among 158 countries.

This results from this publication's third screen on 'drivers for future opportunities' are broadly aligned with the 2019 results from the Readiness for Frontier Technologies, shown in Table 2.9. Aside from Singapore, no SIDS appear in the 'high' readiness category. The four SIDS in the 'upper middle' category – Bahrain, Barbados, Mauritius, and Trinidad and Tobago – are among the handful of SIDS with above-average values in the eight proxy indicators in this publication's Screen 3. The 17 SIDS in the 'lower middle' and 'low' categories need significant improvements across the index's five building blocks if they are to be competitive in innovating and adopting frontier technologies, improvements that mirror the findings in Screen 3.

2.3.5 UNCTAD Productive Capacities Index

UNCTAD's Productive Capacities Index (PCI) is another useful comparator for our findings. The PCI measures productive capacities in 193 economies in a multidimensional and country-specific index, from 2000 to 2018. The PCI comprises 46 indicators, organised into eight subindices: information and communication technologies (ICTs), structural change, natural capital, human capital, energy, transport, the private sector, and institutions. With the PCI, UNCTAD aims to support evidence-based trade and development policies that build productive capacities and foster structural transformation (UNCTAD, 2020c).

Our findings are in line with those of the PCI, as they relate to SIDS. Across most subindices, SIDS performed better than other groups of vulnerable countries, such as LDCs and landlocked developing countries (LLDCs). This was driven by SIDS' relative advantage in developing human capital and employing it in service-oriented economic strategies. In this way, SIDS have had some success in overcoming the constraints imposed by their small size, geographic remoteness and vulnerability to external shocks. As a result, SIDS had higher socioeconomic development outcomes, particularly for their health and education indicators (UNCTAD, 2020b).

Conclusions from the PCI analysis echo that small physical and economic size does not preclude building productive capacity and achieving structural transformation, provided countries exploit their comparative advantages with coherent, forward-looking policy interventions. In the case of SIDS, the PCI analysis recommends pursuing transformative opportunities in financial services, business activities and tourism, among others.

2.4 Discussion

2.4.1 Mixed strategies

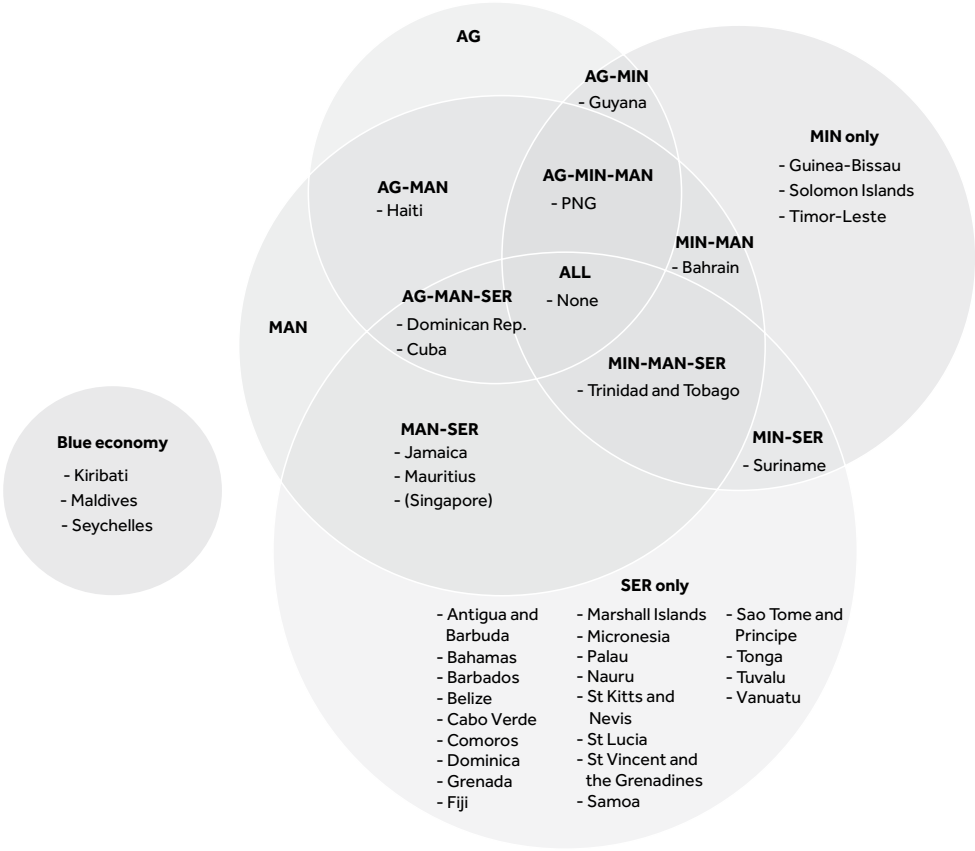
In Screen 1, we observed that none of the 37 SIDS in the sample had sufficient endowments of factors of production – capital, labour and land – to support economic development strategies based on large-scale manufacturing or agriculture, as represented by the MAN and APE threshold groups of countries. Five SIDS had reserves of natural resources suitable to a natural resource-led strategy, based on extractive resources. Meanwhile, the majority of SIDS in the sample had values for domestic market size and access to basic infrastructure that suggest they can compete in service-led strategies.

Looking at the distribution of inputs and outputs in Screen 2, we observed, at the group level, that the economic structure in most SIDS followed their endowment structure. A handful relied to a greater degree on their primary sectors, in line with the MME threshold group, while the majority relied on the tertiary sector, comparable to the SER threshold group.

Looking in detail at the economic structure in individual SIDS, we observe nonetheless some nuances. For example, seven SIDS had higher shares of inputs or outputs in the secondary sector than the MAN threshold group. While this does not suggest a comparative advantage in large-scale manufacturing, it does indicate that these countries are suited to mixed strategies, with small-scale, targeted manufacturing industries complementing the sector in which they have a comparative advantage, for example, extractives or services.

Figure 2.17 depicts a Venn diagram of the potential strategies for the individual SIDS in our sample, among the four economic development strategies profiled in

Figure 2.17 Venn diagram of suitable SIDS strategies



AG: Natural resource-led strategy, agriculture variant.
MAN: Manufacturing-led industrialisation.
MIN: Natural resource-led strategy, minerals variant.
SER: Service-led development.

this publication: manufacturing-led, service-led, and the agriculture and extractive variants of natural resource-led strategy.

We have included a fifth bubble for blue economy strategies, mostly for illustration. Our evaluation framework included only one proxy indicator – capture fisheries production – for the blue economy, as a variant under natural resource-led strategies. As described in subsection 2.3.1, the indicator itself proved less effective than others. More importantly, we did not sufficiently elaborate a holistic concept of the blue economy – integrating services (e.g. tourism), primary activities (e.g. fisheries, subsea mining), and renewable energy – to situate it alongside or overlapping with the other profiled strategies in the Venn diagram. We therefore depicted the blue economy bubble apart from the others and populated it with countries with higher capture fisheries production – countries that would otherwise appear in the services bubble.

The Venn diagram illustrates both the countries with a single, most suitable strategy, e.g. services, as well as the handful of countries that are suitable to a mix of two or three strategies. Although we omitted Singapore from the sample for our evaluation framework, we included it in the diagram for illustration.

As Figure 2.17 illustrates, our evaluation framework identified natural resource-led strategies, based on the extractive (mineral) variant, as the single most suitable strategy for three SIDS: Guinea-Bissau, Solomon Islands and Timor-Leste. Meanwhile, we did not identify large-scale manufacturing- or agriculture-led strategies as suitable for any of the 37 SIDS in our sample. Nor did we identify a mix of all four profiled strategies at once as feasible for any of the SIDS.

Furthermore, we identified 21 SIDS as suited to pure service-led development strategies. This is largely a 'default' finding for these countries, since, through our evaluation, we found: a) that they lacked the prerequisites for the other strategies we used in our simple framework; and b) that the tertiary sector was already predominant in their economic structure. For these countries, this finding may reinforce some of their existing service-led strategies and policies.

Nevertheless, this finding falls short of providing ideas for new strategies or industries, through which these countries could diversify their economies or build productive capacity towards greater economic resilience. More analytical work is therefore required to look more closely at these 21 SIDS, to help them identify new opportunities or variants on their existing strategies.

For the remaining 13 SIDS in the sample, we identified suitable 'mixed' strategies. These typically involve: a) a dominant sector, in which they may enjoy a comparative advantage, relative to the threshold groups included in our framework; plus b) one or two other strategies in which we found them to be competitive, even if their endowments and current structures did not indicate an outright comparative advantage in our framework.

Among these 13 SIDS, Dominican Republic and Cuba emerge as the economies with the greatest prospects for diversification, with opportunities to pursue mixed strategies based on agriculture, manufacturing and services. Somewhat less diversified

currently, Papua New Guinea (agriculture-extractives-manufacturing) and Trinidad and Tobago (extractives-manufacturing-services) also seem to have the prerequisites to pursue a mix of three strategies.

Singapore and Mauritius appear in Figure 2.17 under mixed manufacturing-services strategies and, indeed, both countries are already strong examples. Based on its endowments and structure, Jamaica also appears on this list, with the potential to follow a similar mixed strategy.

As described in Screen 2, Haiti had the highest share of value-added in its secondary sector in the SIDS sample. As a result, our framework suggests that Haiti is suited to following a mixed strategy, based on agriculture and manufacturing.

2.4.2 Future opportunities

With Screen 3, we aimed to evaluate SIDS' positioning relative to future opportunities, in the context of, for example, global value chains and the Fourth Industrial Revolution. For seven of the eight proxy indicators included in Screen 3, the SIDS group was generally better positioned than the threshold groups representing natural resource-led strategies (APE and MME), but trailed the manufacturing- and service-led threshold groups (MAN and SER).

For the eighth indicator – government spending on education as a share of GDP – the SIDS group average was higher than those of the threshold groups.

Although they do not appear to have an outright comparative advantage in most of these forward-looking indicators, compared to the MAN and SER groups of countries, SIDS are nonetheless better placed than many other developing countries, as represented by the APE and MME groups. For example, a subset of SIDS, as well as the overall group average, have higher gross savings, FDI inflow and internet penetration rates than the APE and MME groups.

From this perspective, SIDS can leverage their advantages over other developing countries – in areas such as GDP per capita, spending on education, internet penetration and access to basic infrastructure – to 'build out' the remaining forward-looking drivers that require improvement, such as research and development, human capital development, innovation and governance.

In practice, for example, a human capital development strategy could leverage existing education programmes and infrastructure, coupled with wide internet penetration, to train a critical mass of, first, instructors and researchers to mount targeted technical training programmes and, second, engineers and other graduates to populate targeted new industries in remote services, such as financial technology, outsourced business functions and design.

Developing these drivers of production takes time. As a result, SIDS should adopt a long-term approach to capitalising on new opportunities. In parallel to building the human capital and infrastructure necessary to compete for these opportunities, SIDS can pursue complementary incremental steps by implementing innovative new

technologies in their traditional sectors, or as part of the mixed strategies identified in the previous subsection.

Indeed, upgrading and diversification strategies inevitably involve a degree of path dependence, both at the sectoral and firm levels, especially in countries with relatively low levels of investments in, for example, research and development and capital equipment. In these cases, new, more productive industries evolve from the capabilities developed by the industries that went before (Thrane et al., 2010; Isaksen, 2015; Delgado et al., 2014; Martin and Sunley, 2006).

For example, SIDS with important agricultural sectors could invest in entry-level precision agriculture technologies, with the accompanying extension and information services for farmers. Land-scarce, net-food-importing SIDS could also invest in vertical farming technologies. These technologies do not have general applicability in SIDS, where small markets and limited land area preclude large-scale, export-oriented operations. But implementing these technologies on a targeted, small-scale basis can contribute to immediate policy priorities – increasing agricultural productivity, improving overall food security and nutrition, and reducing food import dependency. Such implementation can also build knowledge of new technologies among local entrepreneurs, engineers and technicians, as part of a long-term strategy for capitalising on future opportunities.

Similarly, SIDS governments can work with large-scale commercial energy consumers, such as tourism resorts, mines or factories, to implement renewable energy technologies that supply a portion of their energy consumption. On one hand, this serves immediate energy transition priorities in many SIDS, as well as aligning with existing energy-transition initiatives in some of these industries, such as mining. On the other hand, these partnerships provide opportunities to build skills with forward-looking technologies for local firms and engineers.

SIDS with established financial services sectors can pursue niche opportunities in financial technology ('fintech'), meaning the platforms, software and services that automate banking and financial services. Given SIDS' small scale, they are unlikely to compete with leading overseas brands of, for example, mobile payment services. Yet many SIDS already specialise in providing niche services to the traditional offshore financial sector, a model that could apply to, for example: mobile and online-only payment platforms for the remittances on which many SIDS depend; and backend, intermediary and data processing services for mobile and online platforms. Looking forward, SIDS can assess how their traditional offshore financial services could be augmented to compete in the cryptocurrency and blockchain sectors.

As part of Screens 1 and 2, we included proxy indicators for the blue economy. Nevertheless, since the blue economy concept lacks a precise definition, in part because of the lack of any real-world examples, we were unable to draw practical conclusions on how SIDS can build their capabilities to capitalise on future blue-economy opportunities. In theory, SIDS with large exclusive economic zones (EEZs) are well endowed to pursue the full range of economic activities included in the blue economy concept. In practice, tourism and capture fisheries remain the only viable

activities, given the lack of clear investment and market rationale for the other, more notional opportunities. Indeed, it seems as if SIDS would need assistance to map, lay claim and use their EEZs – an enormous undertaking – before considering what economic activities could be developed, such as subsea mining or offshore renewable energy installations.

In this vein, new research by UNCTAD suggests that there is a compelling case for SIDS to develop industries to produce alternatives to plastics. SIDS are disproportionately impacted by ocean plastic pollution, which hurts their tourism and fisheries subsectors, for example. Efforts already exist in these countries to use recyclable substitutes for plastics, such as glass or natural fibres, for packaging local products and some exports. SIDS could scale up innovative substitutes to plastic packaging to market at the regional or global levels, representing an opportunity to reduce the threat of plastic pollution as well as driving economic development (Barrowclough and Vivas Eugui, 2021).

Pursuing future opportunities in SIDS requires a long-term plan to build the required drivers, which are often different from those required by traditional primary, manufacturing and service industries. According to the preliminary analysis in this publication, SIDS have an advantage relative to other developing countries in drivers such as education spending, gross savings and internet penetration rates, but need a concerted effort to extend these advantages into better research and development, human capital development, innovation and governance.

Notes

1 The 'blue economy' concept arose from the UN Conference on Sustainable Development in Rio de Janeiro in 2012. See, for example: https://sustainabledevelopment.un.org/content/documents/2978BEconcept.pdf
2 As classified by the World Bank.
3 https://www.globalinnovationindex.org/Home
4 https://info.worldbank.org/governance/wgi/

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