



Alternative Development Strategies for SIDS:

Building Competitiveness in New Industries



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Acronyms

APE	Selected exporters of agricultural products
ECLAC	United Nations Economic Commission for Latin America and the Caribbean
ECOSOC	United Nations Economic and Social Council
EEZ	Exclusive economic zones
EVI	Economic Vulnerability Index
FAO	Food and Agriculture Organization of the United Nations
FDI	Foreign direct investment
GDP	Gross domestic product
ICT	Information and communication technology
ILO	International Labour Organization
IPCC	Intergovernmental Panel on Climate Change
ITU	International Telecommunication Union
IUU	Illegal, unreported and unregulated fishing
LDC	Least developed country
LLDC	Landlocked developing country
MAN	Selected exporters of manufactured goods
MIC	Middle-income country
MME	Selected exporters of minerals and metals
ODA	Official development assistance
OECD	Organisation for Economic Co-operation and Development
PCI	UNCTAD Productive Capacities Index
R&D	Research and development
RCP	Representative Concentration Pathway
SER	Selected exporters of services
SIDS	Small island developing State
TNC	Transnational corporation
UNCTAD	United Nations Conference on Trade and Development
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNWTO	United Nations World Tourism Organization
WIPO	World Intellectual Property Organization
WTO	World Trade Organization

1. INTRODUCTION

Small Island Developing States (SIDS) face severe structural challenges to their sustainable development. The United Nations recognises 38 SIDS,¹ which include some of the poorest and most isolated countries in the world, with relatively small populations and narrow endowments of land and natural resources.

SIDS are a heterogeneous group of countries, with considerable variations in their geographic, demographic and economic characteristics. Nevertheless, common physical characteristics of small size and geographic isolation contribute to their unifying trait: extreme vulnerability to environmental and economic shocks. For example, SIDS were hit hard by the 2008-2009 global financial crisis, from which they had not fully recovered by the time the COVID-19 pandemic plunged the global economy into recession. Compounding these economic shocks, SIDS are on the front lines of climate change, suffering mounting consequences from a humanmade environmental crisis for which they bear little responsibility.

The need to reduce vulnerability and build resilience to external shocks has guided collective efforts by SIDS and the international community. As part of the 2030 Agenda for Sustainable Development, the United Nations devoted an intergovernmental process to assisting SIDS, from which the most recent outcome document is the wide-ranging 2014 SIDS Accelerated Modalities of Action (SAMOA) Pathway, intended to guide international action towards sustainable development in SIDS.

The SAMOA Pathway provides policy guidance on economic, environmental and social priorities in SIDS, as well as on their means of implementation. Although the Pathway was hailed as the basis for a durable global partnership to address SIDS' unique vulnerabilities, its implementation has stalled. This is due to factors such as: insufficient affordable financing, decline in official development assistance (ODA) flows, slow progress on climate change adaptation and a lack of data collection and statistical analysis to support implementation (United Nations General Assembly, 2019). This paper aims to build on the parts of the Pathway devoted to building resilient economies in SIDS.² Economic development strategies are an important piece of the resilience-building agenda. They provide a blueprint for governments and incentives for the private sector to invest in new industries and infrastructure, ideally spurring a self-reinforcing cycle of economic growth and structural transformation, yielding a resilient economy – a pillar of any sustainable development plan.

In this paper, we seek to complement the general vision contained in the Pathway, with more detailed analysis and guidance on alternative economic development strategies for SIDS. This is not intended as a judgement of existing strategies in these countries, but instead to foster new ideas. This is in line with the SAMOA Pathway and the mandate of the United Nations Conference on Trade and Development (UNCTAD) mandate to assist

¹ SIDS' distinct context was recognised at the United Nations Conference on Environment and Development in Rio de Janeiro, Brazil in 1992. In this paper, we use the list of 38 United Nations Members classified as SIDS. See Annex 1 for the list of 38 United Nations Members, as well as the further 20 non-United Nations Members and Associate Members.

² See, for example, paragraphs 24 to 27: United Nations General Assembly (2014). Resolution 69/15: Small Island Developing States Accelerated Modalities of Action (SAMOA Pathway). Available at: <https://sustainabledevelopment.un.org/sids2014/samoapathway>. Retrieved 27 August 2020.

SIDS in building productive capacities, towards structural transformation, as envisioned in the 2016 Nairobi Maafikiano³ and the Report of the Secretary-General of UNCTAD ahead of the fifteenth session of the Conference.⁴

This paper proposes a two-part analysis. In Section 1, we build the case for economic development strategies as an important part of resilience-building in SIDS and the need to identify alternative strategies adapted to their context. Section 2 then proposes a simple framework to evaluate: what exists in terms of SIDS' endowments (Screen 1) and economic structures (Screen 2), to frame how SIDS are positioned to capitalise on future opportunities (Screen 3), in the context of, for example, global value chains and the Fourth Industrial Revolution.

From our analysis, we outline alternative strategies for different types of SIDS, including examples of new sectors, activities and technologies for development. To support these strategies, we recommend policies necessary for SIDS to build their competitiveness in new industries.

This paper does not presume to prescribe short-term fixes to the unique challenges facing SIDS. Instead, we intend for our analysis and recommendations to reinforce an ongoing strategic planning process in SIDS, towards long-term, sustainable economic development. In this respect, the paper is a first step towards more detailed analysis, policy advice and technical assistance on formulating development strategies adapted to SIDS' particular needs.

³ UNCTAD. (2016). Nairobi Maafikiano: From decision to action: Moving towards an inclusive and equitable global economic environment for trade and development. Fourteenth session, 17-22 July. Paragraph 76. United Nations Conference on Trade and Development. New York and Geneva. Available at: <https://unctad.org/webflyer/unctad-xiv-outcome-nairobi-maafikiano-and-nairobi-azimio>. Retrieved: 18 December 2020.

⁴ UNCTAD. (2021). Transforming trade and development in a fractured, post-pandemic world. Report of the Secretary-General of UNCTAD to the fifteenth session of the Conference. New York and Geneva: United Nations Conference on Trade and Development. Retrieved 18 December 2020.

2. SIDS, VULNERABILITY AND THE NEED TO BUILD RESILIENCE

Above all, vulnerability defines SIDS. In this section, we review some of the main forms of environmental and economic vulnerabilities that constrain their sustainable development. We profile these shared vulnerabilities and echo the call for collective action, contained in the SAMOA Pathway, to build the resilience of SIDS to external shocks.

2.1. Climate change

SIDS are on the front lines of climate change. In its 2019 Special Report on The Ocean and Cryosphere in a Changing Climate, the Intergovernmental Panel on Climate Change (IPCC, 2019) detailed observed impacts from climate change, driven by anthropogenic emissions of greenhouse gases, which have altered conditions in oceans and coastal ecosystems.

In general, the IPCC observes that these changes to ocean and coastal habitat have led to the following effects, among others: a decline in fisheries biomass, coupled with a poleward migration of fish stocks, away from the tropics; loss of coastal biodiversity; and salinification of freshwater sources. Human settlements in vulnerable areas have seen a resulting decline in important ecosystem services, such as nearshore and inland fisheries and supplies of fresh water, with its many uses, including for farming and aquaculture (Boojhawon & Surroop, 2020). They have also suffered the erosion of coastal infrastructure, with impacts on access to vital trade and transport links, declines in tourism and some recreational and cultural traditions becoming impracticable (Scott, Hall, & Gössling, 2019). Due to the resulting loss of land area and freshwater supplies, communities and many low-lying coastal areas can no longer support their populations, leading to growing migration flows within countries and abroad.

In this context, SIDS, mainly composed of islands and low-lying coasts, are already suffering disproportionately from the effects of climate change. For example, 80 per cent of the land area in Maldives lies just one meter or less above sea level, meaning that, even under the IPCC's best-case projection – of an average sea level rise of 0.43 meters (m) by 2100 – 77 per cent of Maldives' land area is at risk of being submerged by the end of the century. Other SIDS with the majority of their land area under threat from sea level rise include: Kiribati (average 1.8 m above sea level), the Marshall Islands and Tuvalu (both two meters).

Leaders from SIDS countries have highlighted the paradox that their countries bear little responsibility for the greenhouse gas emissions driving climate change. Meanwhile, they suffer its heaviest effects but receive little assistance in responding to the mounting threats to their development, and to their very existence.

2.2. Natural disasters

Anthropogenic climate change has led to steady changes in marine weather patterns, with the pace of change accelerating since around 2005. In tropical regions, where most SIDS are located, scientists have measured more rain, stronger winds and higher wave heights. This contributes to more intense and frequent extreme weather events, such as tropical cyclones. As extreme weather events become more and more frequent, so does

the risk of so-called compound hazards: multiple weather events occurring simultaneously or in quick succession, potentially compounding the damage they might have inflicted individually (IPCC, 2019).

In the Caribbean, six to eight per cent of the total population live in coastal areas that are highly vulnerable to hazards such as hurricanes and extreme wind and wave events. This underlines the deadly and costly effects of hurricanes in the region over recent years, with category 5 hurricanes devastating Caribbean countries on an almost annual basis since 2016. In the Pacific region, more than 50 per cent of countries' built infrastructure is in high-risk coastal areas. Vital transportation, trade links and essential services are therefore at risk from erosion, sea level rise and extreme weather events.

Many SIDS have always been exposed to seasonal cyclones or hurricanes and have developed coping strategies to repair damage, resume production and reopen trade links. But the growing intensity and frequency of natural disasters has increased the costs of maintenance, repairs and interruptions to business and trade, weighing down the national economy for years after severe storm seasons.

For example, as well as the deplorable loss of life, displacements and everyday privations it inflicted, Hurricane Maria in 2017 caused physical damage in Dominica (an upper-middle-income economy) estimated at 225 per cent of its gross domestic product (GDP), comparable to the damage caused by Hurricane Ivan in Grenada (upper middle-income) in 2004 (Ötoker & Srinivasan, 2018). More recently, Hurricane Dorian in 2019 caused damage in the Bahamas (high-income) worth an estimated 25 per cent of GDP (IADB, 2020).

Furthermore, estimates of the relative costs of climate adaptation in SIDS are among the highest in the world. For example, under the IPCC's most pessimistic scenario—Representative Concentration Pathway (RCP) 8.5, in which greenhouse gas emissions continue to rise until 2100 – the relative cost of coastal adaptation will be highest in the Marshall Islands (7.6 per cent of GDP), Maldives (7.6 per cent), Tuvalu (4.6 per cent) and Kiribati (4.1 per cent) (Diaz, 2016).

2.3. COVID-19

Beginning in early 2020, the COVID-19 pandemic arose as a global health and economic shock, hitting SIDS particularly hard. Many SIDS did not experience a high incidence of infection during the early months of the pandemic, from February through April, when the virus was spreading rapidly in Europe and North America. But infection rates began climbing in some SIDS as of May, in others as of July.

By 24 November 2020, a handful of SIDS had worryingly high COVID-19 incidence rates per 100,000 persons: Bahrain (5,047), Maldives (2,360) and Cabo Verde (1,853). By comparison, incidence rates in other small, non-SIDS developing countries with comparable populations included: Kosovo (1,930), Equatorial Guinea (366) and Lesotho (97). Nevertheless, many other SIDS continued to have relatively low incidence rates since the beginning of the pandemic, especially those in the Pacific region.⁵

⁵ Johns Hopkins University. Coronavirus Resource Centre. Available at: <https://coronavirus.jhu.edu/>. Retrieved 24 November 2020.

As well as the loss of life and the burden on health systems caused by COVID-19, the crisis demonstrated SIDS' severe vulnerability to economic shocks. The United Nations World Tourism Organization (UNWTO) estimates that COVID-19 travel restrictions caused year-on-year international tourist arrivals to fall worldwide by 70 per cent from January to August 2020, representing losses of US\$ 730 billion – eight times the losses the tourism sector incurred during the 2008-2009 global economic crisis – and putting well over 100 million jobs at risk.⁶

In parallel, the World Trade Organization (WTO) estimated in October 2020 that total merchandise trade volume would decline by 9.2 per cent in 2020 because of the COVID-19 pandemic.⁷ The trend in services trade is more severe, with an estimated year-on-year decline of 23 per cent, much higher than the nine per cent decline suffered during the 2008-2009 global financial crisis.⁸ The decline in service trade was exacerbated by restrictions on travel, with a catastrophic effect on international tourism. SIDS keenly felt these COVID-19-related contractions, which impacted tourism and trade, undermining their main sources of foreign exchange, staples and employment and pitching large numbers of people into precarity and food insecurity.⁹

Restrictions related to COVID-19 have also interrupted value chains, especially the flow of essential inputs and intermediate goods to industries (Banga, Keane, Mendez-Parra, Pettinoti, & Sommer, 2020). Most SIDS will suffer disproportionately from these interruptions. Although SIDS are not strongly integrated in global value chains, they typically have concentrated export baskets – comprising raw commodities and, in some cases, intermediate goods. They also rely on imports of staples and finished goods.

As well as a narrow range of export goods, SIDS often depend on a few key export markets. With trade restrictions on the rise during the COVID-19 pandemic, SIDS are therefore more exposed to losses in tax revenue from exports, reducing their governments' capacity to expand public services to meet extraordinary needs during the pandemic (World Bank, 2020).

2.4. Debt

Spending requirements for responses to the acute COVID-19 crisis, piled on top of the chronic needs for climate change adaptation in SIDS, have exacerbated a “debt hangover” in many countries, threatening an outright debt disaster. In the years following the 2008-2009 global financial crisis, economic growth recovered more slowly in SIDS than in other countries with stronger links to the trading system (Cali & Kennan, 2010; UNCTAD, 2019a). As a result, many SIDS governments borrowed to underwrite deficit spending and spur economic growth (Bernal, 2015). These SIDS therefore already had

⁶ UNWTO. (2020). International tourism down 70% as travel restrictions impact all regions. Blog entry. 27 October. Available at: <https://www.unwto.org/news/international-tourism-down-70-as-travel-restrictions-impact-all-regions>. Retrieved 24 November 2020.

⁷ WTO. (2020). Trade shows signs of rebound from COVID-19, recovery still uncertain. Press release 862, 6 October. Available at: https://www.wto.org/english/news_e/pr862_e.htm. Retrieved 27 October 2020.

⁸ Ibid.

⁹ FAO. (2020). Small Island Developing States Response to COVID-19. Policy brief. 7 May. Available at: <http://www.fao.org/policy-support/tools-and-publications/resources-details/en/c/1275322/>. Retrieved 20 August 2020.

high debt service costs when COVID-19 struck, leaving them with little fiscal space to respond and plunging some countries into liquidity crises by mid-2020.

Without short-term injections of liquidity and debt relief through at least 2021, many SIDS governments fear their liquidity problems could escalate into insolvency (United Nations, 2020). Over the medium to long term, SIDS require debt restructuring and a new arrangement to access concessionary finance and aid, for which conditions are largely income-based and ignore vulnerability and debt distress criteria. Without a new arrangement on debt, SIDS face an impossible choice of how to allocate insufficient resources to COVID-19 response, disaster recovery, climate change adaptation or sustainable development objectives under the 2030 Agenda for Sustainable Development (Slany, 2020).

2.5. Economic vulnerability

A key factor in the economic vulnerability of SIDS is their dependence on capital inflows and trade. For example, in most SIDS, foreign aid and remittances represent a larger share of GDP than the average in other developing countries and Least Developed Countries (LDCs). Reliance on foreign direct investment (FDI) flows is more heterogeneous, with SIDS in the Pacific attracting little FDI, relative to those in Africa and the Caribbean (McGillivray, Naudé, & Santos-Paulino, 2010).

Similarly, SIDS rely heavily on trade, including on revenues from commodity exports, as well as on imports of food, fuel and other staples. UNCTAD calculates that 57 per cent of SIDS are commodity export-dependent, meaning they rely on a small number of commodities for 80 per cent or more of their total merchandise exports. This proportion is lower than among LDCs (85 per cent) or developing countries generally (67 per cent) (UNCTAD, 2019c). However, when imports are included, the overall dependence on commodity exports and imports, as a percentage of GDP, is higher in SIDS than in other developing countries (McGillivray, Naudé, & Santos-Paulino, 2010). Because of their commodity dependence, many SIDS are heavily exposed to the volatility in international commodity prices, which is transmitted into their economic growth and tax revenues.

By extension, SIDS are among the most trade-dependent economies in the world. Among the 37 SIDS profiled in this paper, the average trade-to-GDP ratio in 2018 was of 97 per cent, while 12 SIDS had ratios above 100 per cent.¹⁰ Over the last 15 years, the combination of high trade-to-GDP ratios and commodity export dependence meant all but five of the 37 SIDS incurred persistent trade deficits.¹¹

Nevertheless, SIDS' small size and remoteness complicates their participation in global value chains. With poor connections to global shipping networks and small trade volumes, SIDS's transport costs are high, undermining export competitiveness and making inter-island commerce very expensive (UNCTAD, 2014). This contributes to SIDS's low ratio of domestic value-added in their exports. Except for Singapore, SIDS rely on imports, rather than domestic inputs and intermediate goods, to produce their exports.

¹⁰ Source: World Bank and OECD national accounts data

¹¹ Source: International Monetary Fund, Balance of Payments Statistics Yearbook

Furthermore, SIDS' share of total value added in end products is much lower than the world average.¹²

Efforts by SIDS to integrate global value chains, as well as increase and upgrade domestic value addition have often fallen short due to a lack of competitiveness, based on high transaction costs, low productivity and low-quality goods and services (Lanz & Werner, 2016).

As a result, among the 145 countries included in the 2018 Economic Vulnerability Index (EVI) – calculated as one of the three criteria for the identification of LDCs – 25 of the 40 most vulnerable countries were SIDS, including eight of the 10 most vulnerable. Even relatively wealthy SIDS, such as Bahrain (62nd most vulnerable) and Singapore (87th), were far from being among the least vulnerable countries in the EVI: the Republic of Korea (144th) and Turkey (145th).¹³

2.6. Building resilience

Consensus exists among SIDS and the international community that achieving sustainable development in these chronically vulnerable countries will require building their resilience to environmental and economic shocks. SIDS continue to echo the urgency of these needs, in the face of the mounting frequency and severity of shocks in recent years.

A robust intergovernmental process in the United Nations system has generated consensus and calls to action on building resilience and fostering sustainable development in SIDS. The resulting programme of action is contained in the agreements adopted by SIDS at, to date, three International Conferences on Small Island Developing States, namely: the Barbados Programme of Action of 1994, the Mauritius Strategy of 2005 and the SIDS Accelerated Modalities of Action (SAMOA) Pathway of 2014. The latter agreement is part of the United Nations 2030 Agenda for Sustainable Development, alongside agreements such as the Addis Ababa Action Agenda on financing for development and the Paris Agreement on greenhouse-gas-emissions mitigation, adaptation, and finance.

The SAMOA Pathway is appropriately ambitious, acknowledging SIDS' vulnerabilities and proposing a wide-ranging programme of action on their economic, environmental and social priorities. The Pathway devotes sections to, for example: climate, change, oceans and seas, water and sanitation, food security and nutrition.¹⁴ For each section, the Pathway outlines policy priorities and lists recommended actions by governments and, where applicable, development partners.

Implied in the SAMOA Pathway's programme of action is a significant role for the state, including increases in public investment and spending on the listed priorities. The agreement recognises that SIDS governments are unable to meet these spending

¹² Source: UNCTAD-Eora Global Value Chain Database.

¹³ Secretariat of the Committee on Development Policy. LDC Data. Available at: <https://www.un.org/development/desa/dpad/least-developed-country-category/ldc-data-retrieval.html>. Retrieved 20 August 2020.

¹⁴ See Annex 2 for the headings and subheadings in the SAMOA Pathway.

requirements from their existing revenue base and that international financing must be mobilised.

In the years since they agreed on the SAMOA Pathway, SIDS have decried the lack of assistance from development partners and investment from the private sector – where were prerequisites to advance the SAMOA Pathway programme of action (Chastanet, Déau, & Toyota, 2020). For example, despite the Pathway calling for developed countries to increase ODA to SIDS and reduce barriers to accessing concessional finance, the opposite has occurred. Net ODA to SIDS rose from US\$ 3.56 billion in 2014 to US\$ 6.24 billion in 2016, then dropped to US\$ 4.16 billion in 2018.¹⁵ ODA flows have since diminished further due the effects of the COVID-19 pandemic. Highly indebted middle-income SIDS continue to struggle to access concessional finance and aid, due to income-based eligibility criteria. The nine SIDS classified as LDCs fear that graduation from LDC status could disrupt their access to concessional finance (United Nations General Assembly, 2019). Meanwhile, the flow of remittances, another major source of income for SIDS, continues to be interrupted by high transaction costs and international de-risking efforts (Dubrie, Thorne, Fontes de Meira, Bello, & Phillips, 2019). Without reversing these trends and dramatically increasing inflows, national budgets are insufficient to implement the SAMOA Pathway and many SIDS will remain trapped in an unsustainable cycle of disaster and debt, unable to move forward.

Under the section “sustained and sustainable, inclusive and equitable economic growth with decent work for all”, the SAMOA Pathway also recognises the importance of appropriate economic development strategies – “taking into account... individual country circumstances and legislation”¹⁶ – to achieve the level of economic growth and job creation necessary to underpin the proposed programme. For example, more jobs are required to redress high rates of unemployment and more high-skill jobs are required to capitalise on the human capital development and technology transfer actions recommended in the Pathway. This paper seeks to build on the economic pillar of the SAMOA Pathway, by identifying alternative development strategies for SIDS.

The multilateral process is bolstered by a diverse body of research on the challenges and vulnerabilities faced by SIDS, from their exposure to climate change and natural disasters, to human development outcomes, to their dependence on aid, trade and the exploitation of natural resources.¹⁷ Abundant policy analysis also exists on building

¹⁵ United Nations Statistics Division. Indicator 17.2.1: Net official development assistance, total and to least developed countries. Series: Net official development assistance (ODA) to small island states (SIDS) from OECD-DAC countries by donor countries, 2000-2018 (millions of constant 2018 United States dollars). Available at: <https://www.sdg.org>. Retrieved 15 December 2020.

¹⁶ United Nations General Assembly. (2014). Resolution 69/15: Small Island Developing States Accelerated Modalities of Action (SAMOA Pathway). Paragraph 27. Available at: <https://sustainabledevelopment.un.org/sids2014/samoapathway>. Retrieved 27 August 2020.

¹⁷ See, for example, UNU-WIDER’s 2006-2007 project on “Fragility and development”, with SIDS as one of its foci, available at: <https://www.wider.unu.edu/archive#406>. See also the resolutions and reports devoted to climate adaptation for SIDS in the proceedings of the UN Framework Convention on Climate Change (UNFCCC), available at: <https://unfccc.int/process-and-meetings/parties-non-party-stakeholders/parties/party-groupings>.

resilience in SIDS on specific priorities, such as food security,¹⁸ or on specific economic sectors, especially the blue economy¹⁹ and one of its main subsectors, tourism.²⁰

Analyses of macro-level economic development strategies for SIDS as a group are scarcer. Nonetheless, detailed analyses exist that feature SIDS or small states in the regions where SIDS are concentrated. For example, in its 2019 Asia-Pacific Countries with Special Needs Development Report,²¹ the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP, 2019) concluded that agriculture-led strategies had the greatest potential to deliver both employment and improvements in labour productivity in countries with special needs in the Pacific. In another regional example, in its 2014 Caribbean Development Report, on “Exploring strategies for sustainable growth and development in Caribbean small island States”, the United Nations Economic Commission for Latin American and the Caribbean (ECLAC, 2014) advised Caribbean SIDS to develop new creative and information and communication technology (ICT) industries sectors and diversify offerings in the all-important tourism sector, given the threat posed by increased international scrutiny of the offshore financial services sector.

This paper seeks to build on this body of policy analysis, identifying alternative economic development strategies for SIDS as part of the resilience-building effort envisioned in the SAMOA Pathway. Economic development strategies provide a blueprint for governments and incentives for the private sector to invest in new industries and infrastructure, ideally spurring a self-reinforcing cycle of economic growth, increased productivity and wages, followed by upgrading and diversification into new industries. This cycle yields structural transformation and a resilient economy, a pillar of sustainable long-term development.

2.7. Navigating heterogeneity among SIDS

Formulating economic development strategies is complicated by the lack of an agreed definition of SIDS – membership in the group is based on participation in intergovernmental negotiations and the International Conferences on Small Island Developing States,²² rather than on specific quantitative or qualitative criteria.

In the absence of formal criteria, the SIDS group includes a heterogeneous mix of countries. For example, the group’s “small island” moniker includes: vast archipelagos

¹⁸ See, for example, the FAO’s work on SIDS, available at: <http://www.fao.org/sids/en/>.

¹⁹ See, for example: Commonwealth Secretariat. (2016). *The Blue Economy and Small States*. London: Commonwealth Secretariat. Available at: <https://books.thecommonwealth.org/blue-economy-and-small-states-paperback>. See also: UNCTAD. (2014). *The oceans economy: Opportunities and challenges for SIDS*. New York and Geneva: United Nations Conference on Trade and Development. Available at: https://unctad.org/en/PublicationsLibrary/ditcted2014d5_en.pdf.

²⁰ See, for example: UNWTO. (2004). *Making Tourism Work for Small Island Developing States*. Madrid: World Tourism Organization. Available at: <https://www.e-unwto.org/doi/book/10.18111/9789284407828>. See also: Hampton, M. P., & Jeyacheya, J. 2013. *Tourism and Inclusive Growth in Small Island Developing States*. London: Commonwealth Secretariat. Available at: <https://books.thecommonwealth.org/tourism-and-inclusive-growth-small-island-developing-states-paperback>.

²¹ For UNESCAP, “countries with special needs” include Landlocked Developing Countries (LLDCs), Least Developed Countries (LDCs) and Small Island Developing States (SIDS).

²² See “About the Small Island Development States”, UN Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States (UN-OHRLLS), <http://unohrls.org/about-sids/>.

of small islands, such as Solomon Islands and Vanuatu; island nations with a tiny land area, such as Nauru and Tuvalu; smaller archipelagos with one large, economically dominant island, such as Cuba and Samoa; single-island nations such as Barbados; states with a mix of a continental land mass and offshore islands, such as Guinea-Bissau; entirely continental countries such as Belize and Guyana; and countries with land borders on large, shared islands, such as Timor-Leste and Haiti.

There is also significant heterogeneity within the group's "development" moniker, with wealthy, advanced economies, such as the Bahamas, Bahrain and Singapore, alongside some of the world's poorest countries, such as Comoros and Kiribati.

By extension, economic structures vary considerably by country, including relatively diversified economies, such as Dominican Republic and Mauritius; those reliant on agriculture, such as Tonga, or extractive industries, such as Papua New Guinea and Trinidad and Tobago; and many others that depend heavily on tourism or fisheries.

Some existing economic indicators illustrate well SIDS' particular characteristics. For example, their shared economic vulnerability is well captured by the EVI, as mentioned above. By contrast, their small economic scale and the effects of geographic smallness, isolation and dispersion are more difficult to capture as indicators, precluding a quantitative classification of SIDS, like the one that exists for LDCs,²³ or for income-based country groupings.

We propose that more research and policy analysis is needed to assist SIDS in formulating and implementing economic development strategies that are suited to their circumstances. Section 2 of this paper is intended as a first step in this direction, using a simple framework to categorise SIDS economies according to their existing endowments (Screen 1) and economic structure (Screen 2), which then frames how they are positioned to pursue new opportunities (Screen 3) in the context of, for example, global value chains and the Fourth Industrial Revolution.

For the international community, we intend for the results of this analysis to inform efforts to build resilience in SIDS, foster more detailed analytical work on SIDS-specific economic development strategies and, ultimately, tailored policy advice and technical assistance for implementation in individual SIDS. At the national level, this analysis is meant to reinforce SIDS' strategic planning, by evaluating how they can pursue new opportunities, spur economic growth and transform their economies, towards greater resilience and sustainable development, as envisioned in the SAMOA Pathway.

²³ LDCs are classified according to a detailed definition, underpinned by statistical indicators, and a formal review process under the Committee for Development Policy, a subsidiary body of the United Nations Economic and Social Council (ECOSOC). This formal structure allows bilateral and multilateral bodies to implement targeted programmes for LDCs, such as technical assistance and preferential treatment in trade, aid and development finance.

3. IDENTIFYING ALTERNATIVE DEVELOPMENT STRATEGIES FOR SIDS

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

3.1. 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 frames the subsequent analysis of SIDS' existing endowments (Screen 1) and economic structure (Screen 2).

3.1.1. *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 developmental state 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, Province of China and, more recently, China itself. Among 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 succeeded in developing manufacturing as an engine of economic growth and development were able to mobilise a critical mass of factors of production. These include, 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** 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, de Vries, & de Vries, 2015).

3.1.2. 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 developmental state 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 variant²⁴ on natural resource-led development, with 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

²⁴ The “blue economy” concept arose from the United Nations Conference on Sustainable Development in Rio de Janeiro in 2012. See, for example: <https://sustainabledevelopment.un.org/content/documents/2978BEconcept.pdf>

balance socio-economic 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, 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**

3.1.3. 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 information and communication technologies (ICT) 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, Rextina, Ahmed, & Tamimy, 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.²⁵

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 & Theodossiou, 2012; Haraguchi, Cheng, & Smeets, 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.

²⁵ UNCTAD, (2020). Impact of COVID-19 on tourism in small island developing states. Blog entry. Available at: <https://unctad.org/en/pages/newsdetails.aspx?OriginalVersionID=2341>. Retrieved: 4 September 2020.

3.2. Methodology

In this section, 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 paper’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)

3.2.1. *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

Table 1 outlines the proxy indicators we use to represent the endowments identified in the previous subsection and against which we will screen the SIDS.

Table 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.

Endowment or stock	Proxy indicator	Commentary
Ocean area and coastal distance	Capture fisheries production	<p>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 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.</p>
Reserves of natural resources	Total natural resource rents (% of GDP)	<p>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.</p>
Domestic market size	GDP per capita	<p>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.</p>

Endowment or stock	Proxy indicator	Commentary
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 paper, with access to electricity as the proxy indicator.

3.2.2. 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 - 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.

3.2.3. 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, 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, advances in transportation and, especially communications technologies, allowed transnational corporations (TNCs) 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 & Nayyar, 2017; Crosby, Mann, & Brauch, 2016). The Fourth Industrial Revolution therefore risks widening inequalities between, on one hand, innovators and early adopters and, on the other hand, laggards, 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.

Table 3 - Indicators for Screen 3

Driver	Proxy indicator	Commentary
Investment capital	Gross savings rate	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

Driver	Proxy indicator	Commentary
	Net FDI inflows	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	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.
	Tertiary enrolment rate	

Driver	Proxy indicator	Commentary
Innovation	Total patent applications	For this driver, the World Intellectual Property Organization's (WIPO) Global Innovation Index ²⁶ 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) ²⁷ 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.

3.2.4. 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 use in this framework, including the number of SIDS data points for each one.

3.2.5. Sample

We applied our evaluation framework to a sample of 37 SIDS, essentially the list of 38 United Nations Member States designated as SIDS (see Annex 1), minus Singapore.

²⁶ <https://www.globalinnovationindex.org/Home>

²⁷ <https://info.worldbank.org/governance/wgi/>

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

- a) The full United Nations list of 38 SIDS (not selected);
- b) **The United Nations list, minus Singapore, of 37 SIDS (selected);** and
- c) The United Nations list, less high-income countries,²⁸ 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, leaving 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.

3.2.6. 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 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.

²⁸ As classified by the World Bank.

Table 4 - Country groupings for evaluation thresholds

Economic development strategy	Representative group of countries		
	Name (source)	Code	Countries
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

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 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 of little value as a benchmark or way forward for SIDS.

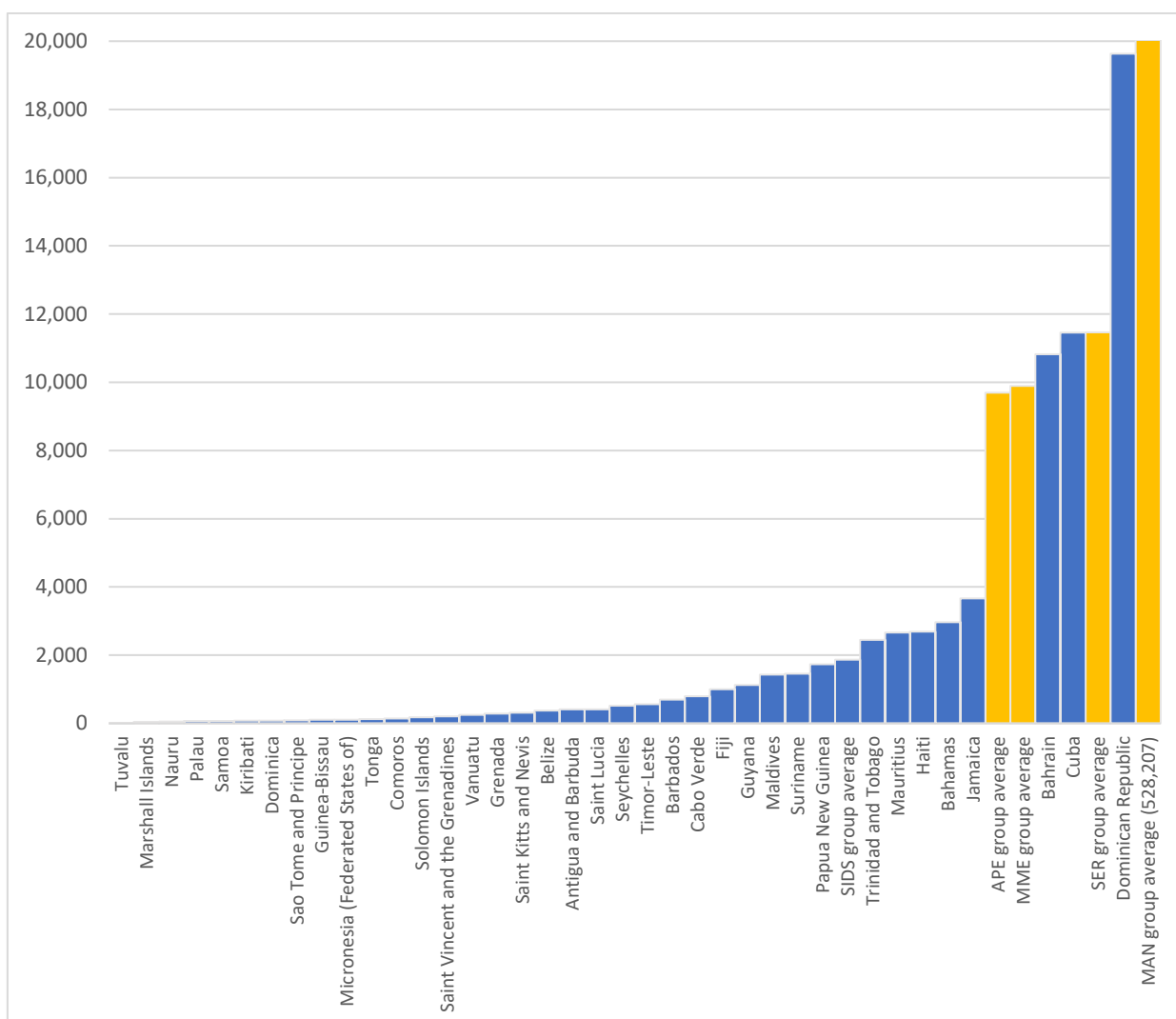
3.3. Results

3.3.1. Screen I – 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 1, only Dominican Republic exceeded the SER group average of US\$ 11.5 billion.

Figure 1 - Gross fixed capital formation, current US\$ millions (2018)

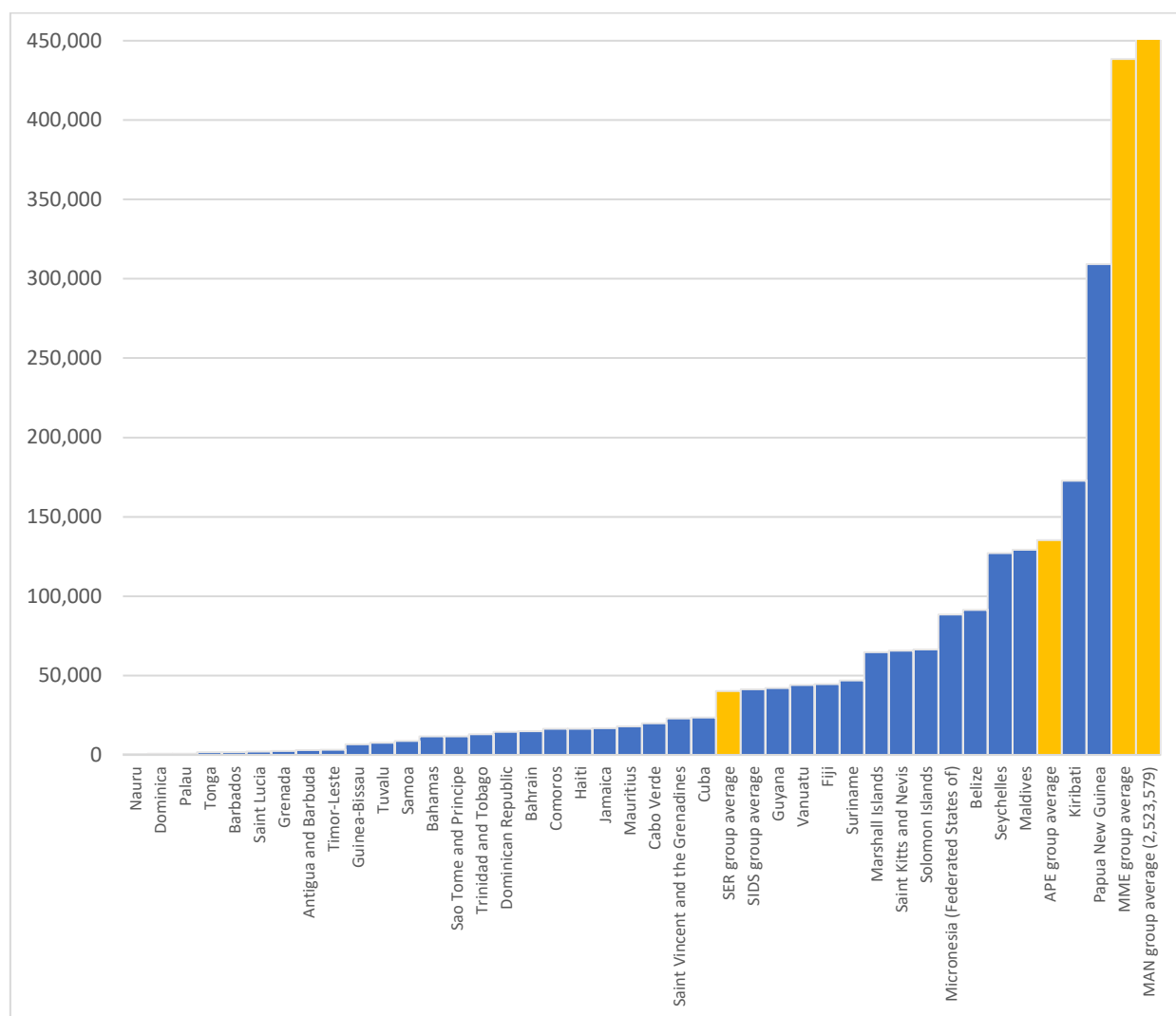


Source: UNCTAD

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 438,000 MT and the closest SIDS – Papua New Guinea, at a little more than 300,000 MT. As shown in Figure 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 - Capture fisheries production, MT (2018)



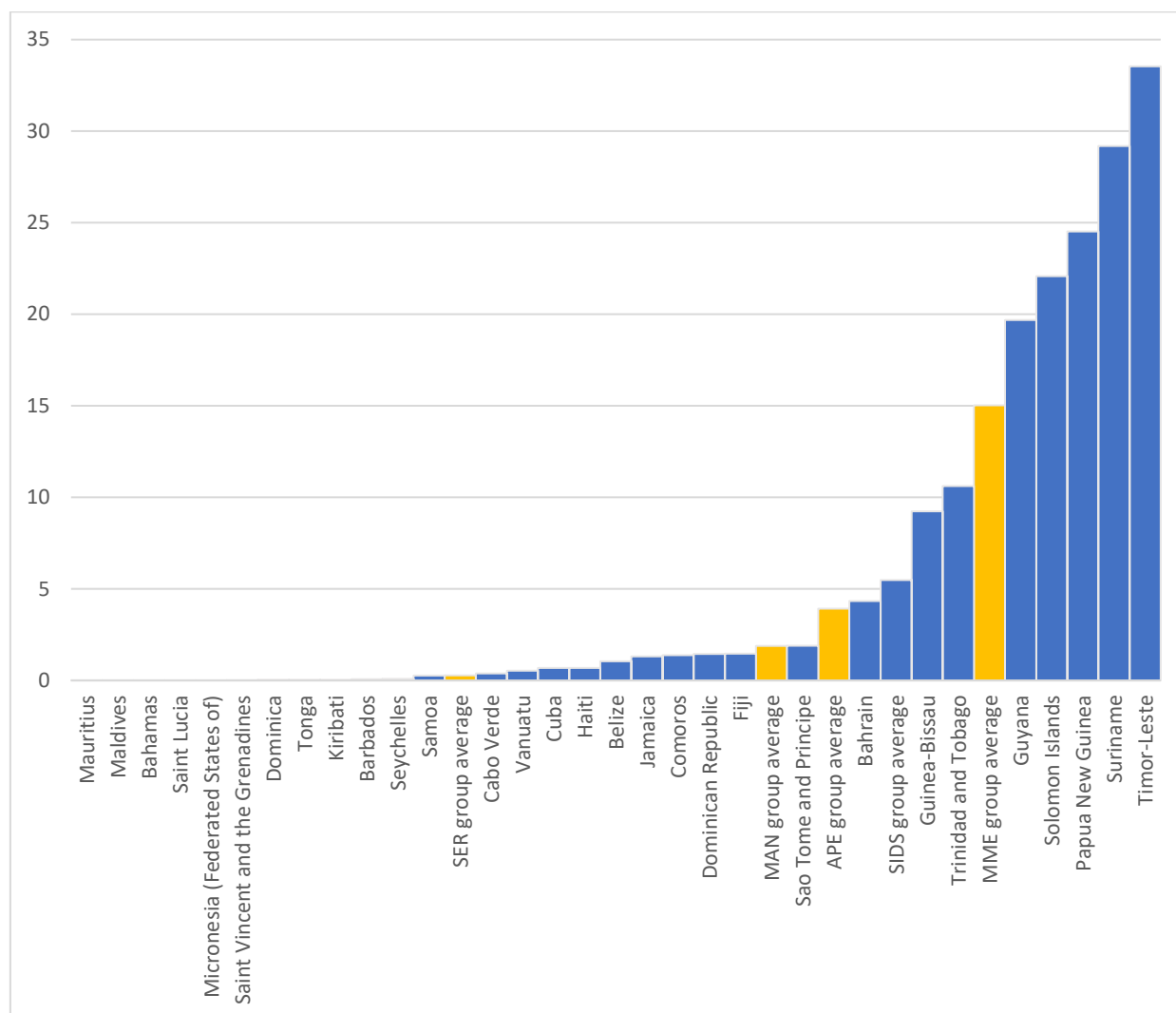
Source: World Bank

Nevertheless, since we emphasise in this paper 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 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 and Tobago (11 per cent), Guinea-Bissau (nine per cent) and Bahrain (four 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 two per cent.

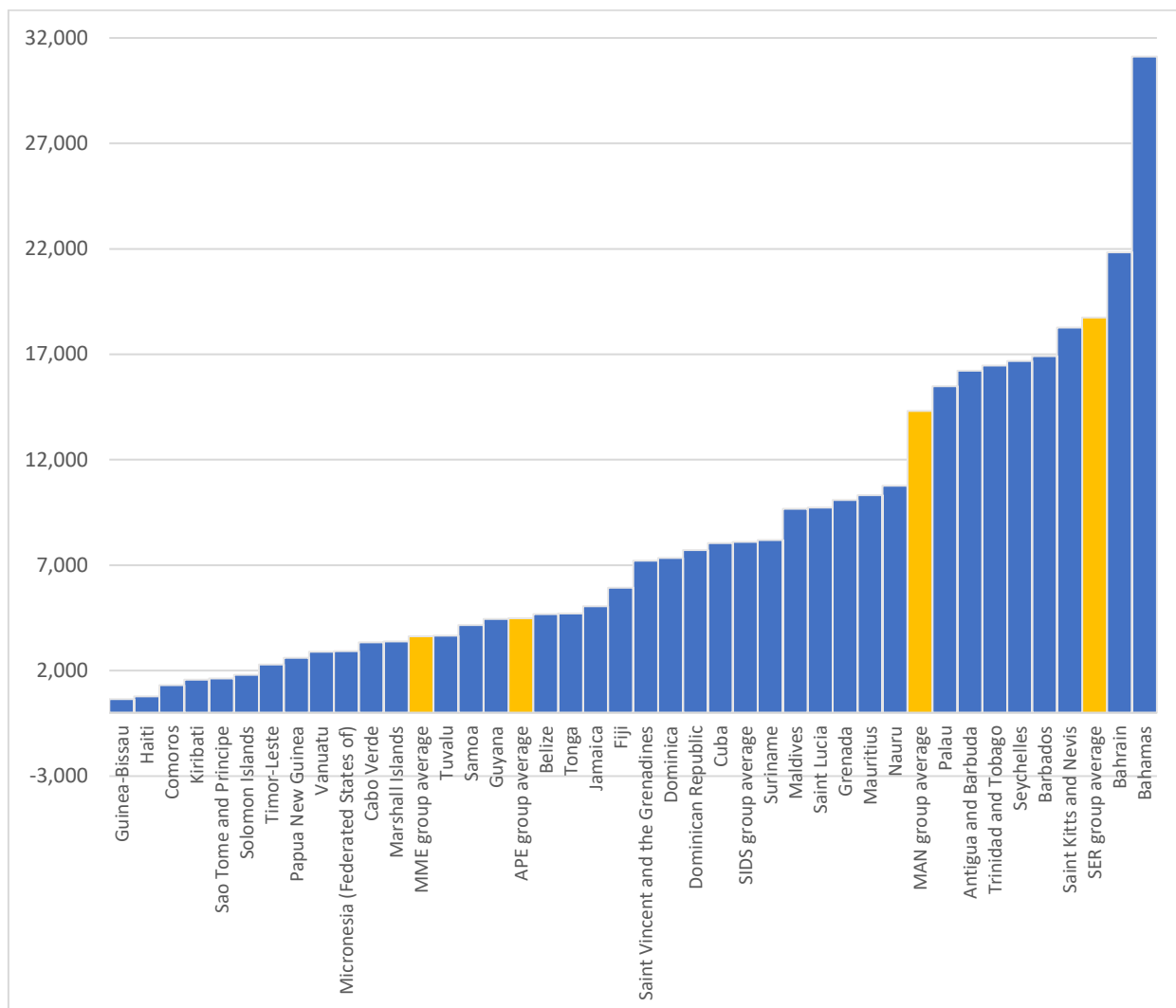
Figure 3 - Natural resource rents, % of GDP (2018)



Source: World Bank

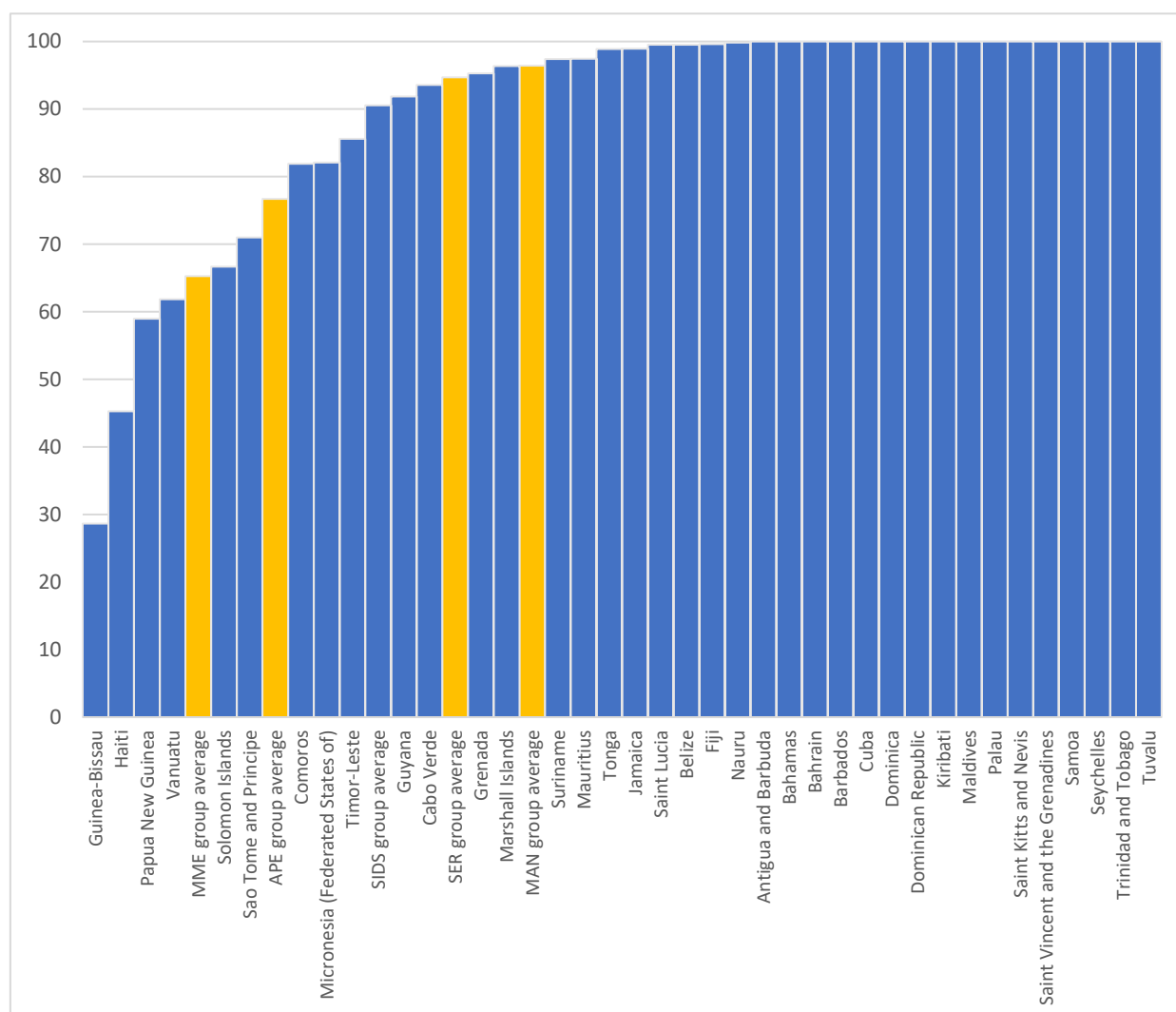
As our proxy indicator for **domestic market size**, Figure 4 shows that eight SIDS, as well as the SER group average, had higher GDP per capita values than the MAN group average of approximately US\$ 14,300. A further 14 SIDS had higher GDP per capita values than the APE group average of US\$ 4,500 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 4 - GDP per capita, constant 2015 US\$ (2018)



Source: UNCTADStat

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

Figure 5 - Access to electricity, % of population (2018)

Source: Sustainable Energy for All (SE4ALL) database

Table 5 summarises the results for the seven indicators, as described in the previous paragraphs.

Table 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

#	Endowment or stock	Proxy indicator	Unit	SIDS (n / 37)	Threshold group averages				# of SIDS exceeding MAN average
					SER	APE	MME	MAN	
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 access to electricity	% of population	37	95	77	65	96	24

Table 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.

Table 6 – Screen 1 indicators by development strategy

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

3.3.2. 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 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 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.

Table 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

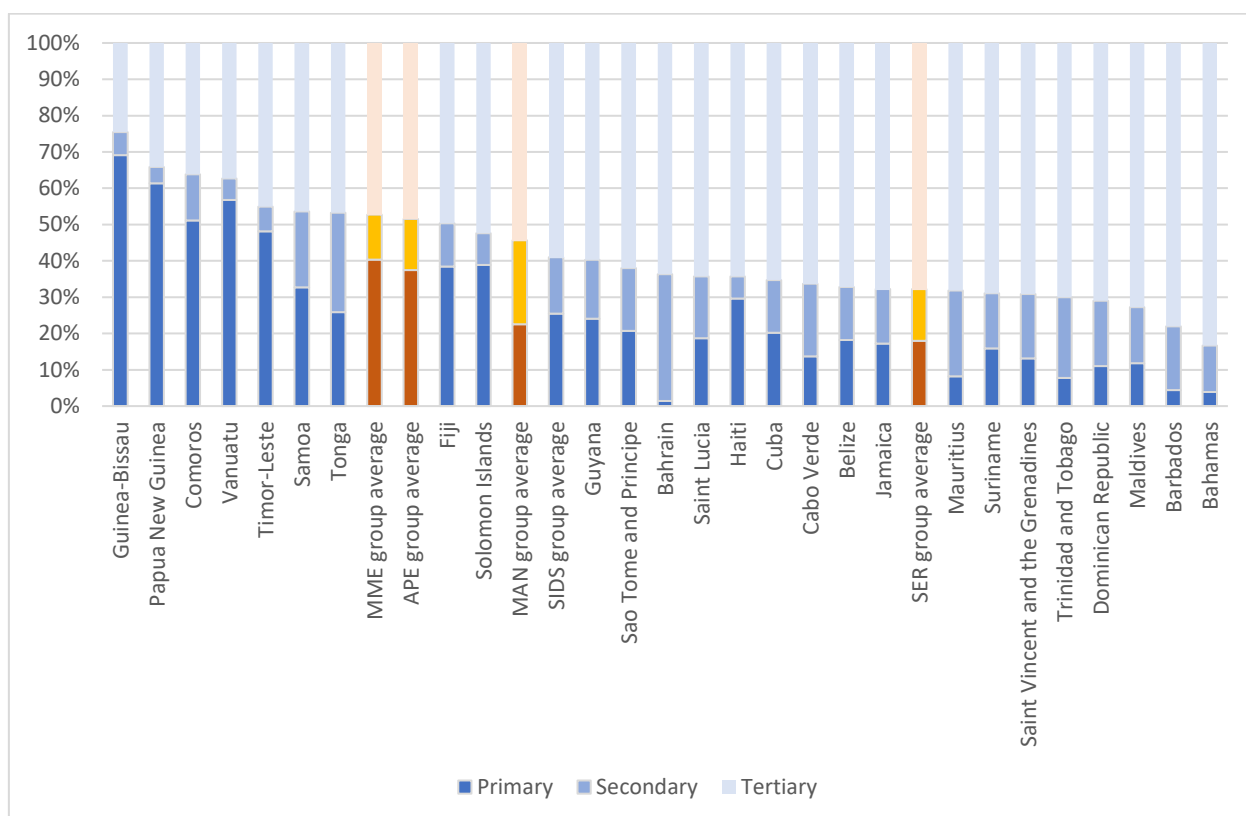
Source: International Labour Organization (ILO) (employment), United Nations, National Accounts Estimates of Main Aggregates (value added)

The figures in Table 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.

Looking more closely at the individual indicators, Figure 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.

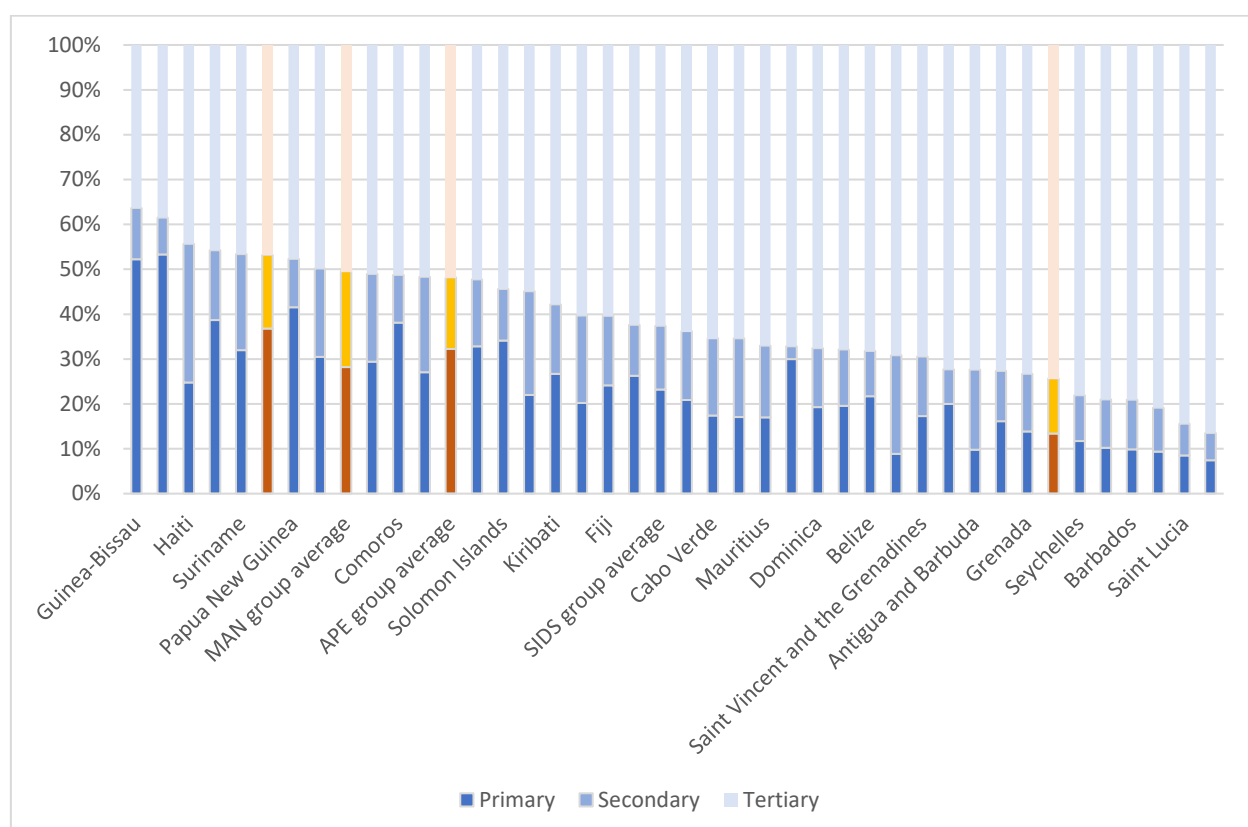
Figure 6 - Employment by sector, % of total (2018)



Source: ILO

Figure 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:

- 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, Saint 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 (Bahamas, Barbados, Maldives, Palau, Saint Lucia and Seychelles) have a higher share of value added in the tertiary sector and 31 had a lower share.

Figure 7 - Value added by economic sector, % of total (2018)

Source: United Nations, National Accounts Estimates of Main Aggregates

A high dependence on trade is another defining characteristic of many SIDS economies. As shown in Table 8, relative to the threshold groups, the average trade-to-GDP ratio in SIDS (97.3) is 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.

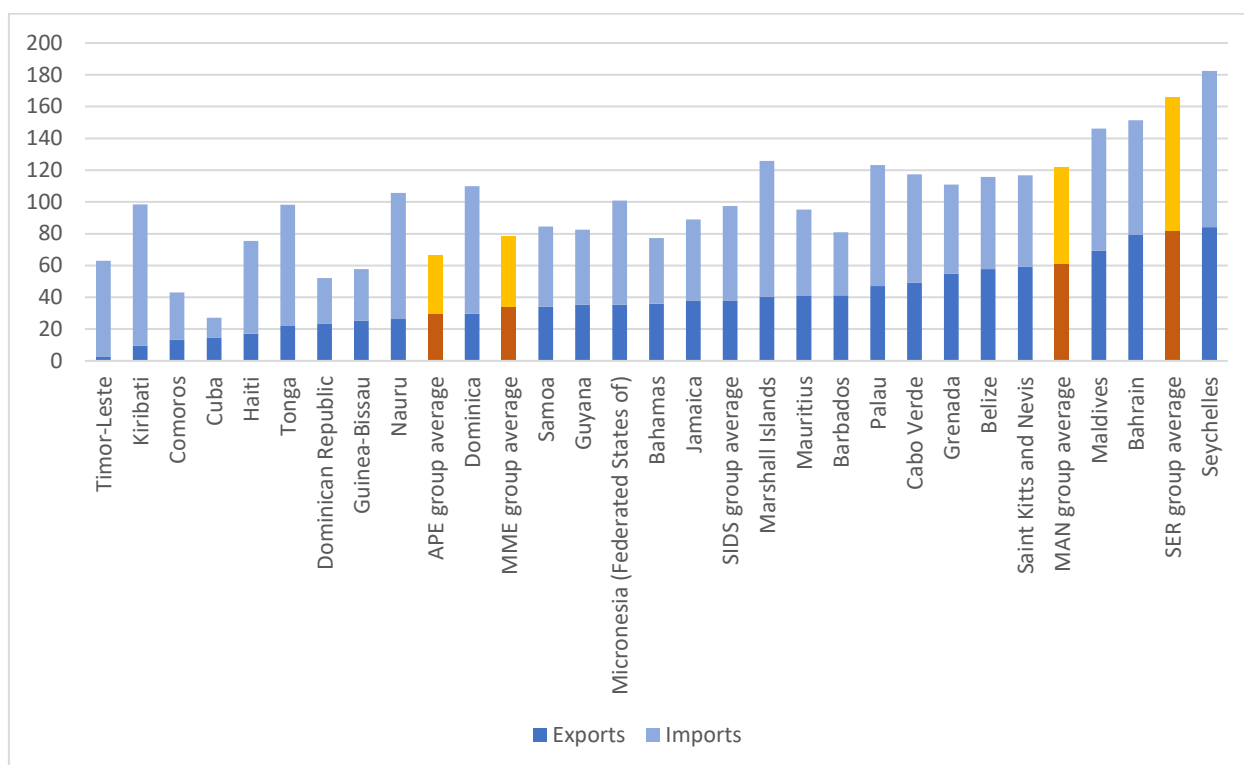
Table 8 - Average trade-to-GDP ratio in SIDS and MICs (2018)

#	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 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 had 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.

Figure 8 - Trade as a percentage of GDP (2018)



Source: World Bank and OECD national accounts data

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.

Among the 24 SIDS suited to service-led strategies, the economic structure in six – Bahamas, Barbados, Maldives, Palau, Saint 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, Saint 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

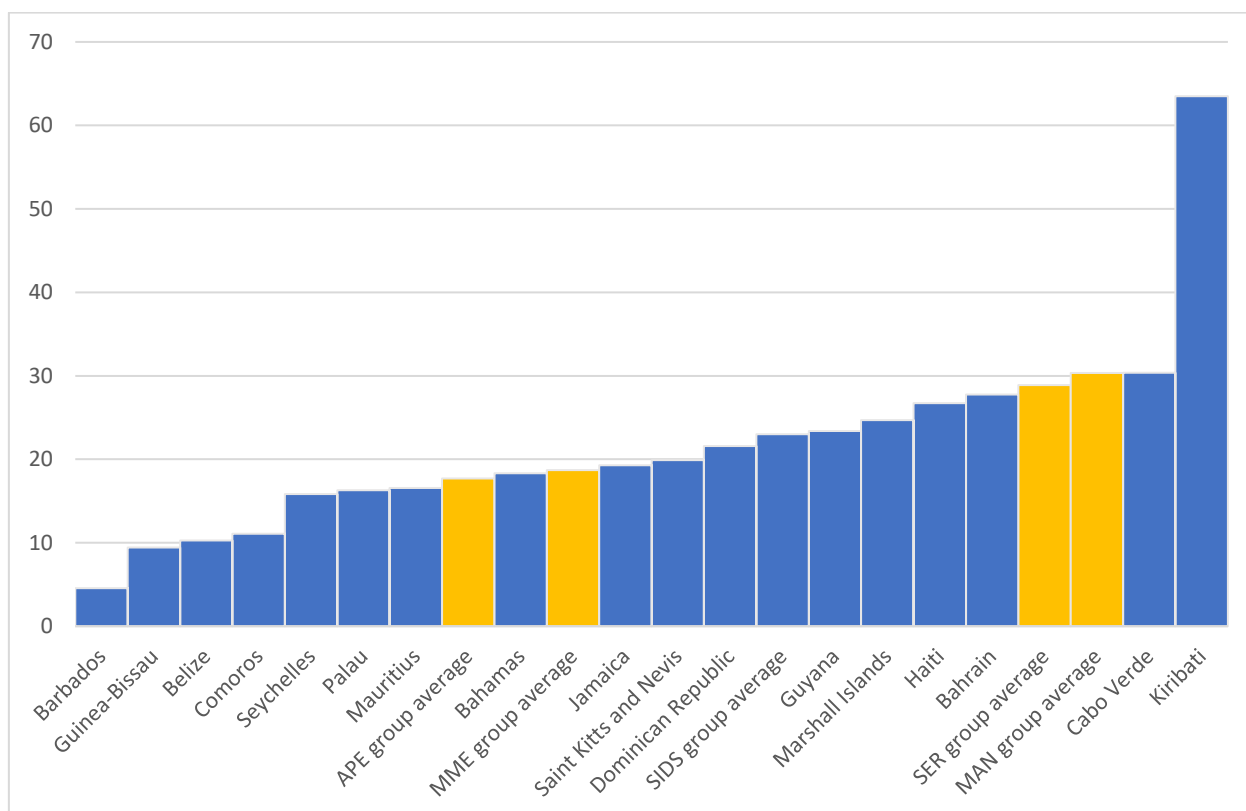
- Haiti's endowments pointed towards a service-led strategy; however, within the SIDS group, it had the highest share of value added in the secondary sector (30.9 per cent) and among the lowest in the tertiary sector (44.3 per cent).

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 include 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 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.

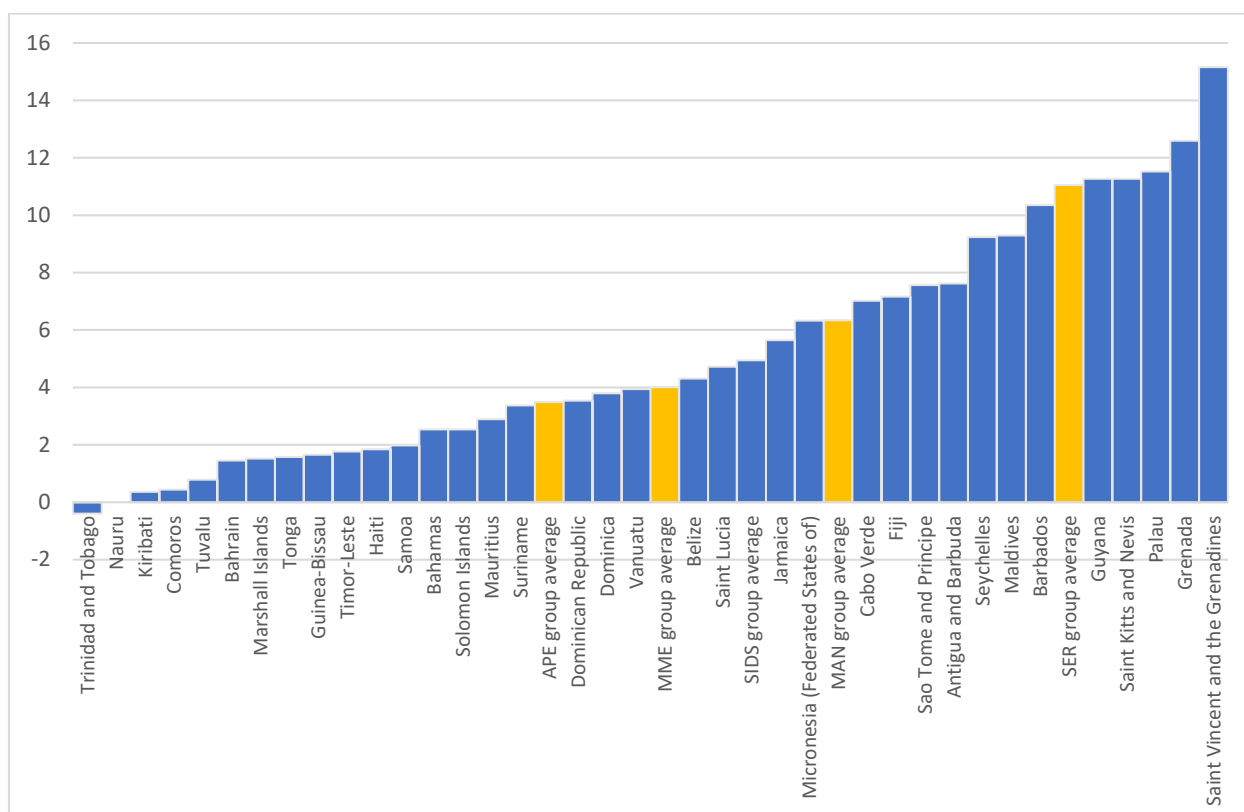
Figure 9 - Gross savings rate, % of GDP, five-year average (2014-18)



Source: World Bank and OECD national accounts data

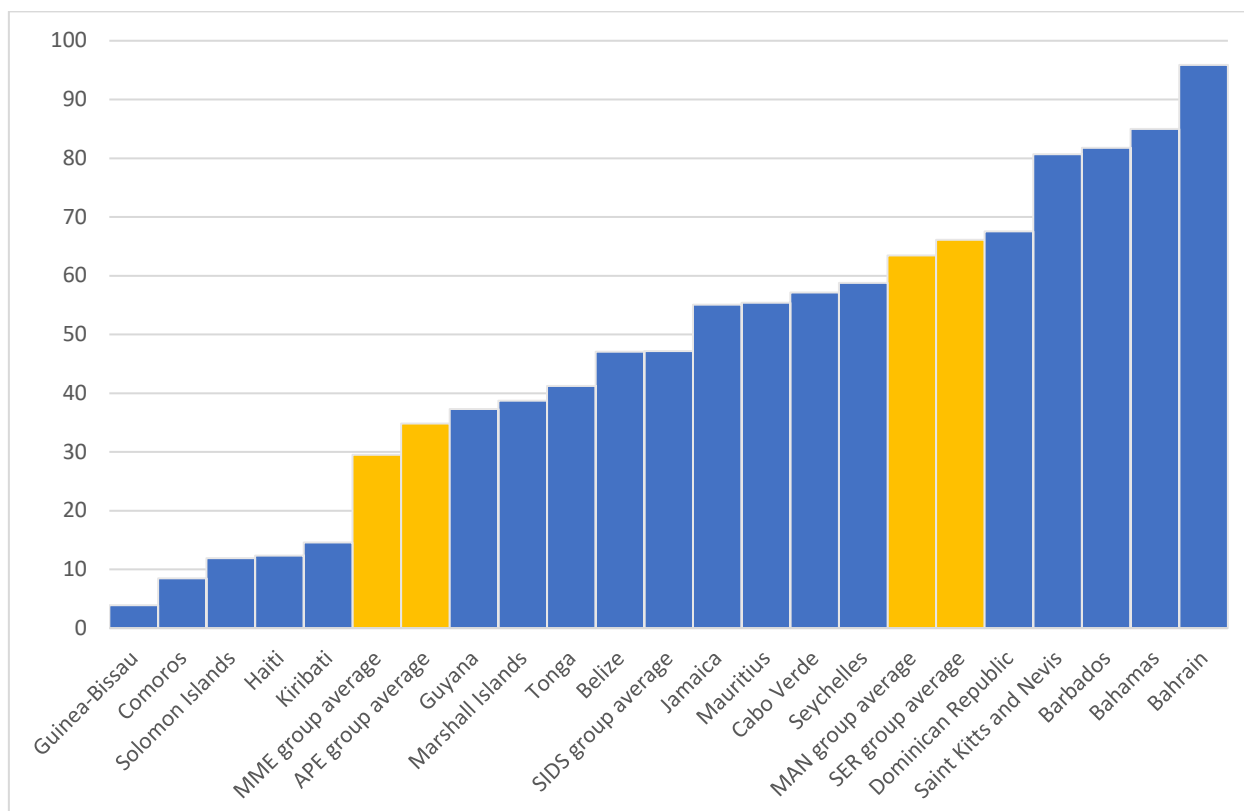
Figure 10 depicts the second proxy indicator for available investment capital: net FDI inflows, as a percentage of GDP over the period 2014-18, for 36 SIDS and the group averages. Five SIDS – Grenada, Guyana, Palau, Saint Kitts and Nevis and Saint Vincent and the Grenadines – had higher relative FDI inflows than the SER group average, while a total of 12 had higher values than the MAN group average.

Figure 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 11 - Proportion of population using internet, % (2017)

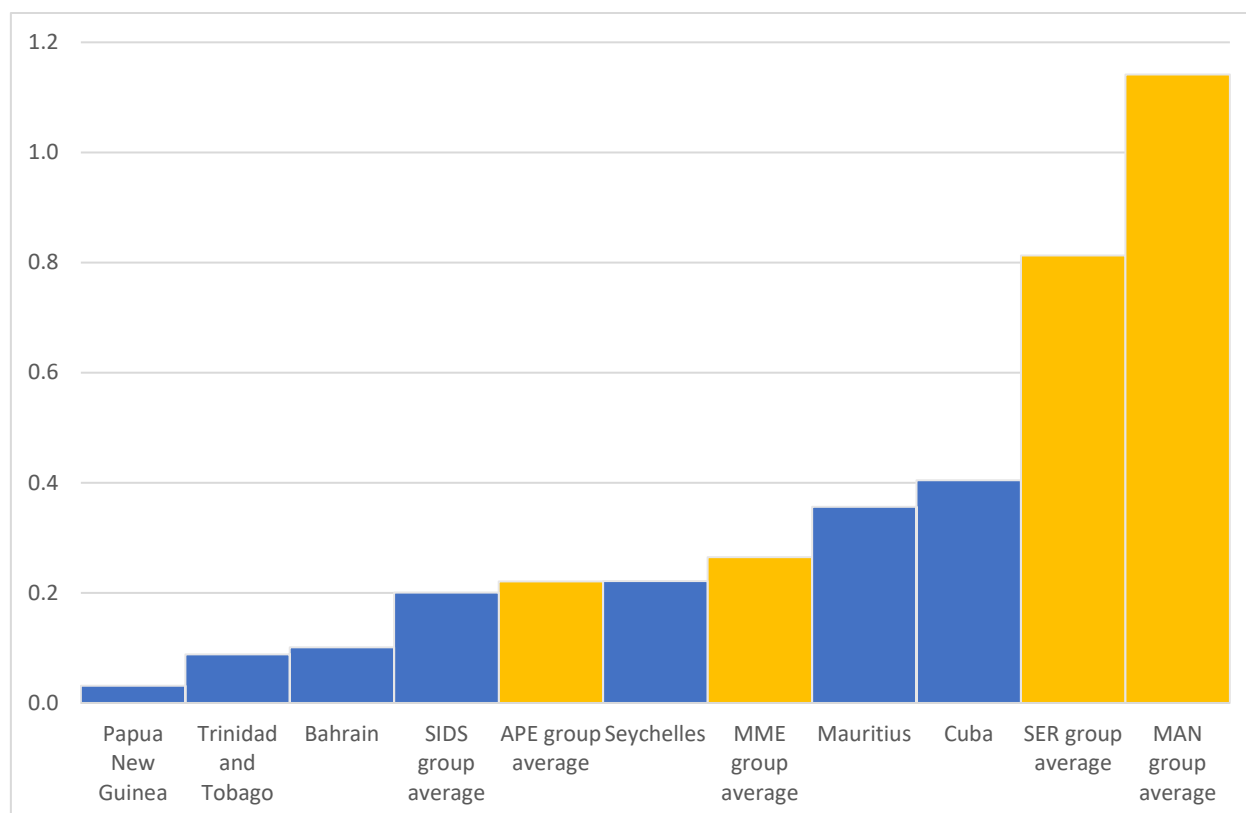


Source: ITU-ICT Indicators Database

As a proxy indicator for ICT utilisation, Figure 11 shows the proportion of the population using the internet in 2017 for 34 SIDS and the group averages. Five SIDS in the sample – Bahamas, Bahrain, Barbados, Dominican Republic and Saint 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 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 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.

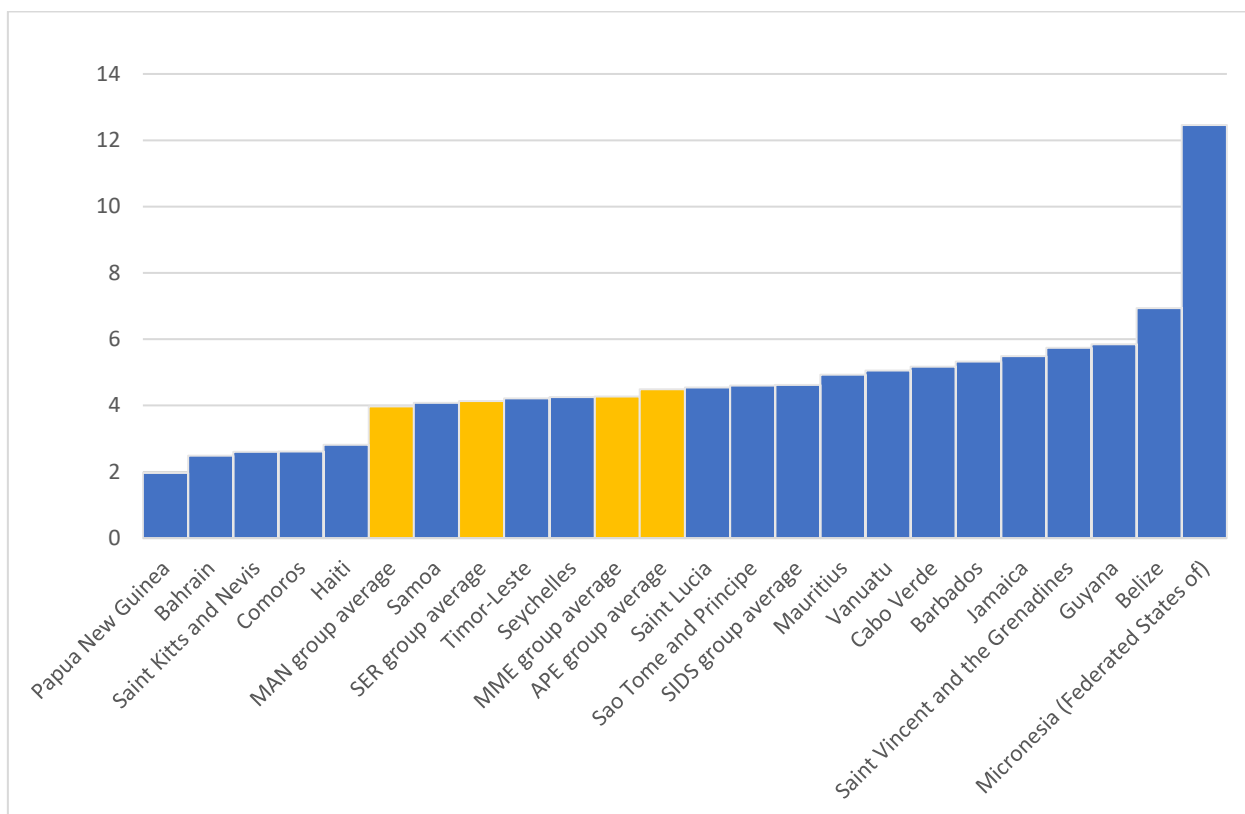
Figure 12 - R&D expenditures, % of GDP, five-year average (2014-18)



Source: United Nations Educational, Scientific and Cultural Organization (UNESCO) Institute for Statistics

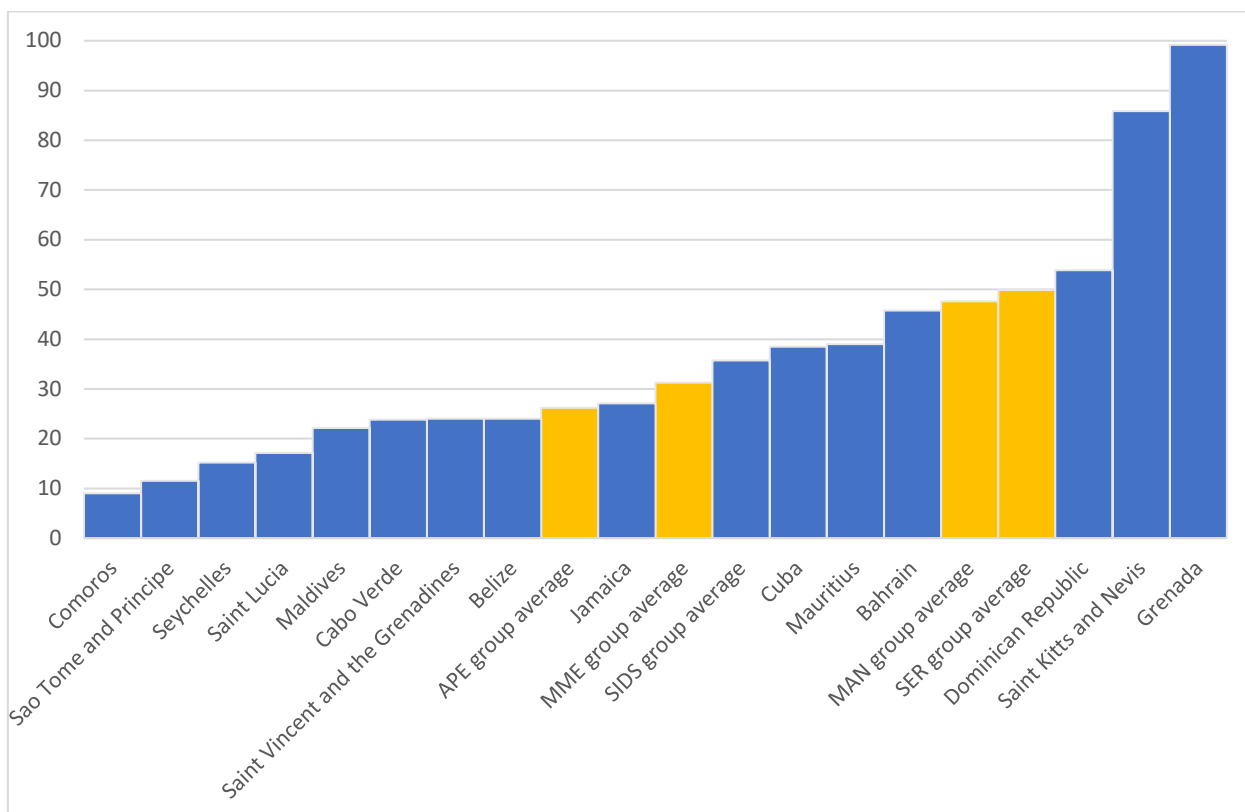
We included two proxy indicators for the important driver of human capital: government expenditures on education and tertiary enrolment rates. Figure 13 shows average government expenditures on education, as a percentage of GDP, over the 2014-18 period, for 22 SIDS and the group averages. Half of the 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 13 - Government expenditures on education, % of GDP, five-year average (2014-18)



Source: UNESCO Institute for Statistics

Figure 14 - Tertiary enrolment rate, % of gross, five-year average (2014-18)

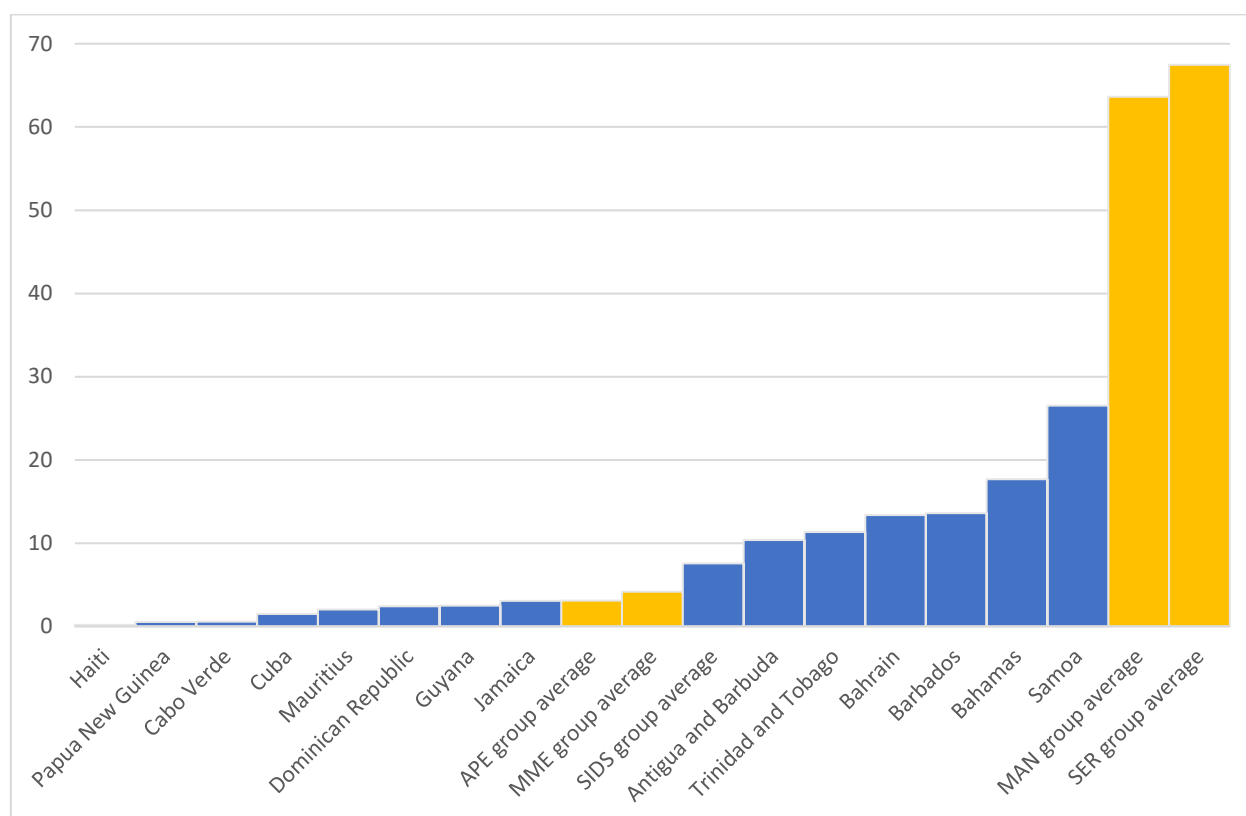


Source: UNESCO Institute for Statistics

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

Figure 15 - Average total patent applications, # per 100,000 inhabitants (2014-18)



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

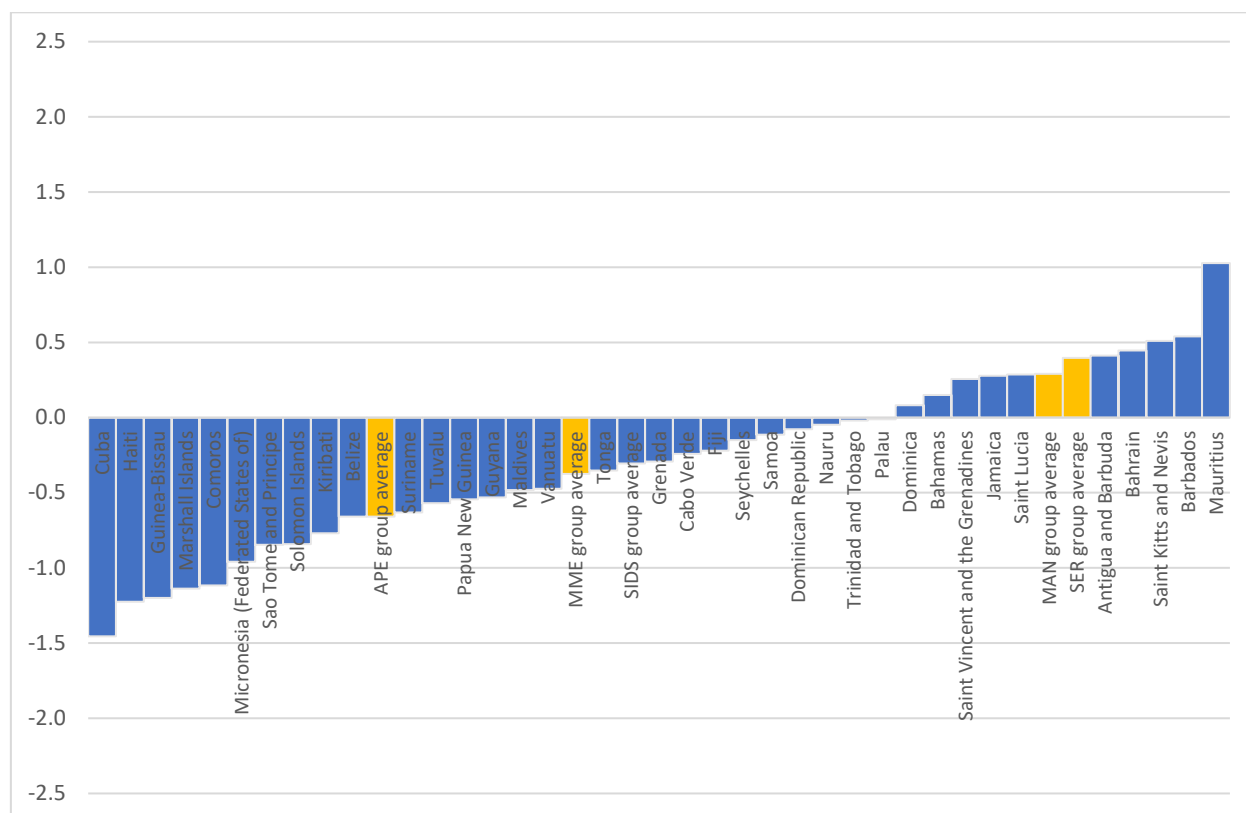
As a proxy indicator for institutional quality, Figure 16 depicts 2018 values of the regulatory quality subindex, from the Worldwide Governance Indicators (WGI) database, for 36 SIDS and the group averages. In its various subindices, the WGI scores countries along a scale from -2.5 for weak governance, to +2.5 for strong governance. The chart illustrates, for example:

Five SIDS in the sample – Antigua and Barbuda, Barbados, Bahrain, Mauritius and Saint Kitts and Nevis – had higher regulatory quality scores than the SER and MAN group averages;

10 SIDS had regulatory quality scores above 0, three at exactly zero and 23 below; and

The average score for the SIDS group was -0.3, underlining the need for improved governance in many SIDS.

Figure 16 - Regulatory quality index, -2.5 (weak) to 2.5 (strong) (2018)



Source: World Bank, *Worldwide Governance Indicators*

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;
- 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.

3.3.4. Readiness for Frontier Technologies Index

For the 2021 Technology and Innovation Report, UNCTAD (2021a) 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:

- ICT deployment;
- Skills;
- R&D activity;
- Industry activity; and
- 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:
 - United States of America (1.00)
 - Switzerland (0.97)
 - United Kingdom (0.96)
 - Sweden (0.96)
 - 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 paper's Screen 3 on "drivers for future opportunities", presented in the previous subsection.
- For comparison with this paper's results, therefore, Table 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 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
Bahamas	0.39	84	Lower middle
Fiji	0.37	88	Lower middle
Suriname	0.34	92	Lower middle
Saint 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
Saint Vincent and the Grenadines	0.22	120	Low
Sao Tome and Principe	0.12	140	Low

SIDS	Total score	Rank	Category
Comoros	0.10	142	Low
Timor-Leste	0.09	144	Low
Haiti	0.04	154	Low

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

Source: (UNCTAD, 2021a)

This results from this paper’s third screen on “drivers for future opportunities” are broadly aligned with the 2019 results from the Readiness for Frontier Technologies, shown in Table 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 paper’s Screen 3. The 17 SIDS in the “lower middle” and “low” categories need significant improvements across the index’s five building blocks to compete in innovating and adopting frontier technologies, improvements that mirror the findings in Screen 3.

3.3.5. 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, 2020b).

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, 2021b).

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.

3.4. Discussion

3.4.1. 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 follows their endowment structure. A handful relied to a greater degree on their primary sectors, in line with the MME threshold group, while the majority of them relied on the tertiary sector, comparable to the SER threshold group.

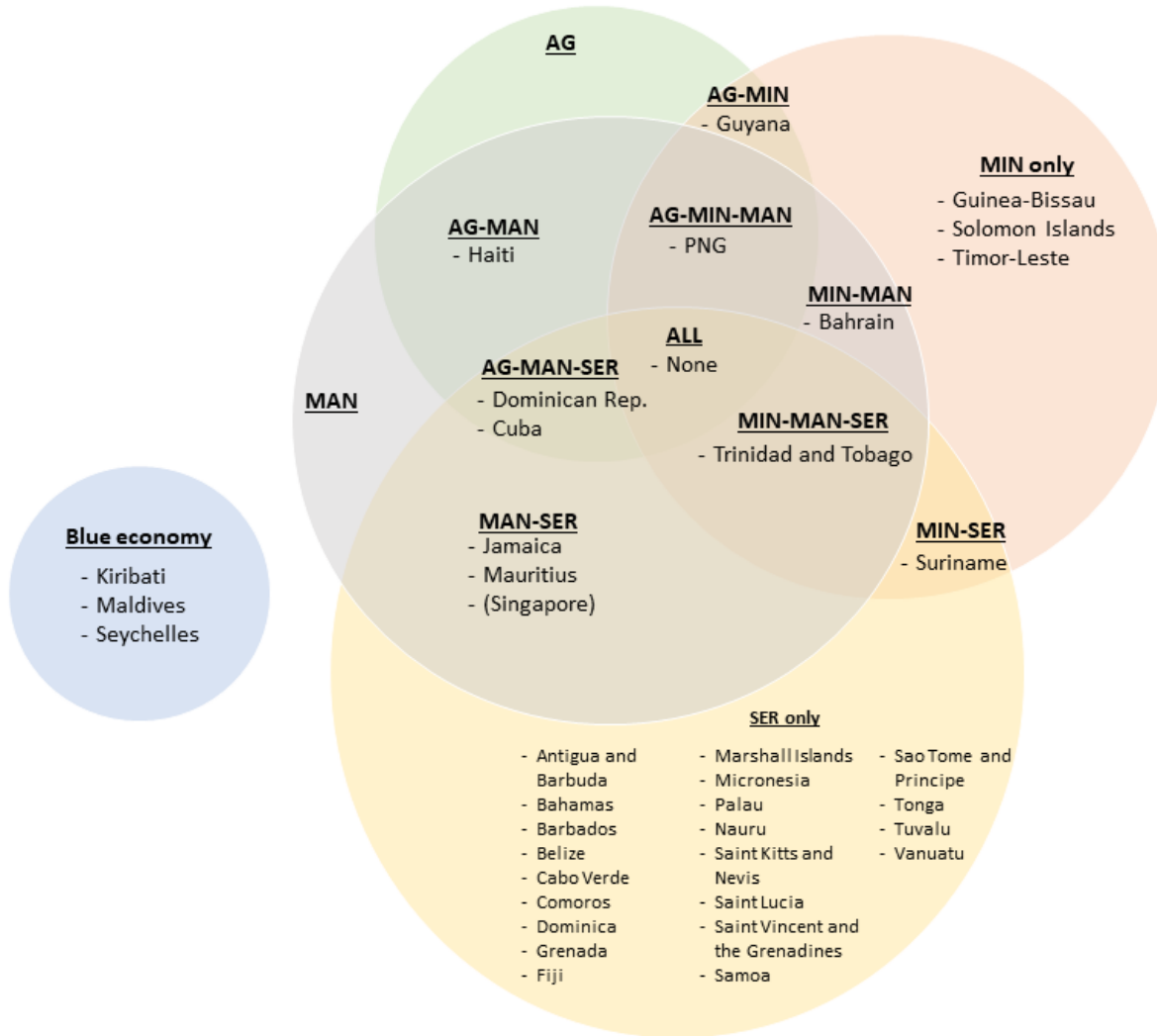
Looking in detail at the economic structure in individual SIDS, we observe nonetheless some nuances. For example, seven SIDS had higher shares of inputs or outputs in the secondary sector than the MAN threshold group. While this does not suggest a comparative advantage in large-scale manufacturing, it 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 17 depicts a Venn diagram of the potential strategies for the individual SIDS in our sample, among the four economic development strategies profiled in this paper: 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.

Figure 17 - Venn diagram of suitable SIDS strategies



MIN: Natural resource-led strategy, minerals variant

SER: Service-led development

As Figure 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 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.

3.4.2. 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, Blaabjerg, & Moller, 2010; Isaksen, 2015; Delgado, Porter, & Stern, 2014; Martin & 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 – as well as building 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 & 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 paper, 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.

4. CONCLUSION

Achieving sustainable development in SIDS requires building their resilience to the environmental and economic vulnerabilities that define them. As part of this effort, SIDS require economic development strategies that deliver economic growth, diversification and structural transformation.

Devising transformative economic development strategies in SIDS is complicated by their small populations and narrow resource base. Successful examples of countries that have transformed their economies in the post-war period, typically involve building economies of scale in selected industries by capitalising on a relative abundance of factors of production – capital, labour and land.

Although united by their small size and vulnerability, SIDS are otherwise quite heterogeneous, including countries with a broad range of income levels, economic complexity and productive capacity. This heterogeneity complicates a coherent policy treatment of the SIDS group, whether for international assistance, or identifying economic development strategies that respond to their particular needs.

In this paper, we proposed a simple evaluation framework to identify alternative economic development strategies for SIDS. We began by looking at what exists, in terms of SIDS' endowments (Screen 1) and economic structures (Screen 2). These screens underlined, for example, that: a) SIDS' economic structures largely follow their endowment base; b) SIDS' endowments do not support large-scale manufacturing strategies and only a handful of SIDS are endowed for natural resource-based strategies; and c) as a result, most SIDS rely on services, mainly tourism.

Thus far, these findings repeat what SIDS already know about their dependence on the tertiary sector. But for 15 of the SIDS in the sample, the analysis also identified the potential for mixed strategies in one or two other sectors. In these cases, the 15 SIDS do not have a comparative advantage in the other sectors. However, according to the proxy indicators we used, they had values close to the threshold group averages for the distribution of inputs (in this case, employment) or outputs (value added) in the secondary or primary sectors. This suggests they can explore mixed strategies, with, for example, targeted, small-scale manufacturing activities that complement the country's predominant sector, mainly services or extractives.

In Screen 3, we looked at SIDS' positioning to capitalise on future opportunities, in the context of global value chains and the Fourth Industrial Revolution. Although traditional factors of production are still required to compete for these opportunities – particularly skilled workers – success depends more on dynamic drivers that allow firms and workers to innovate and adapt to the rapid pace of technological change and shifting global value chains.

For the eight proxy indicators used in Screen 3, SIDS' values were mediocre relative to the threshold groups, especially the manufacturing- and service-based groups of economies. SIDS had higher average government spending on education than all threshold groups. But for the remaining seven indicators, they rated below the manufacturing- and service-based economies and were on either side of the averages for the agriculture- and extractive-based economies.

On this basis, SIDS can leverage their comparative advantage in education spending, as well as their above-average performance in, for example, income per capita, gross savings and internet

penetration rates, to boost their performance in the lagging drivers, such as research and development, human capital development, innovation and governance. This effort can form the basis of a long-term strategy to compete for future opportunities in, for example, financial technology, outsourced business functions and design.

Intermediate steps to this long-term strategy could include investing in new technologies in SIDS' established sectors, including in the mixed strategies identified. These can include, for example, precision agriculture or public-private partnerships with the main energy consumers to build renewable energy generation capacity. These initiatives can serve immediate policy priorities, such as food security and energy transition, while building skills in new technologies among local firms and workers.

4.1. Policy recommendations

For SIDS wishing to pursue future opportunities in global value chains or the Fourth Industrial Revolution, as part of their overall economic development strategy, we recommend implementing the following policies.

Extractive sector:

- Prioritise revenues over other strategic objectives, such as value addition. This requires an efficient taxation regime, with a balance of production, export and income taxes, maximising revenues over a project's anticipated life cycle.
- Earmark a portion of revenues and rents from extractive projects to provide a predictable stream of investments and spending in: a) other productive sectors with long-term potential for diversification and structural transformation of the economy; and b) drivers supporting these new opportunities, including research and development, human capital development, innovation and governance.
- Employ sound macroeconomic management to prevent export earnings from the extractive sector inflating the exchange rate of the local currency, which can erode the net benefit accrued from exploiting natural resources, undermine other export sectors and complicate efforts to diversify into new industries.

Agricultural sector:

- For the few SIDS with important agricultural sectors and/or competitive advantages in agriculture, create incentives to invest in smart agriculture technologies, including precision and vertical agriculture, on a targeted and small-scale basis, with the dual objective of reinforcing food security and nutrition, as well as providing opportunities for technology transfer and human capital development for local firms and workers.
- Identify and pursue niche opportunities for value addition, including for by-products, to build productive capacity.

Future opportunities:

- Identify and prioritise high-value activities that do not rely on economies of scale or a geographic proximity to markets, such as niche opportunities in fintech, outsourced business functions or design.
- Support priority opportunities with public investments and spending in infrastructure, research and development, human capital development and innovation.
- Expand and ensure access to relevant enabling infrastructure, such as the internet, energy and transport.
- Engage the private sector in developing new research and development programmes in priority industries.
- Maintain an ongoing dialogue among government, employers and trade unions to inform human capital development programmes, manage employment expectations and preserve social cohesion through periods of economic structural transformation.
- Create incentives to mobilise domestic savings and FDI inflows into investments in productive capital – including both new technologies to upgrade existing sectors, as well as drivers and activities in pursuit of future opportunities.
- Expand service offerings in the tourism and financial sectors, with an emphasis on those involving new technologies.
- Where possible, engage in public-private partnerships with large energy consumers, such as tourism resorts, mines and factories, to construct renewable energy sources, with an emphasis on technology transfer and human capital development for local firms and workers.
- Continue to expand internet penetration through public investments in infrastructure and the adoption of ICTs in public education.
- Leverage relatively high education spending into other drivers for future opportunities. Examples could include: training a critical mass of researchers and instructors and mounting tertiary and vocational training programmes oriented towards priority industries.
- Reinforce science, technology, engineering and mathematics (STEM) in the public education curriculum and support apprenticeships for graduates to acquire practical experience.
- Include explicit language in all policies and programmes that ensures equal access to new opportunities for women, minorities and youth.
- Improve governance through policy, regulatory and institutional reforms that strengthen, for example, property rights, the rule of law and competition, with a view to fostering innovation, entrepreneurship and investment.
- Improve disaster risk management by building a coherent network of institutions and preparedness measures at the regional, national and local levels.

4.2. Topics for further study

This paper is intended as a first step, leading to more detailed analysis on alternative strategies to build economic resilience in SIDS economies. Based on our findings and recommendations, we identified the following topics for further analysis:

- Case studies of the development trajectories of SIDS and other small states that successfully transformed their economies (e.g., Costa Rica, Mauritius and Singapore);
- Expanded service offerings in the tourism and financial services sectors in SIDS;
- Identification of niche agricultural value addition opportunities in SIDS;
- Natural resource revenue management models for SIDS;
- Identification of niche opportunities in fintech, outsourced business functions and design; and
- Feasibility assessments for blue-economy activities in SIDS, outside of tourism and fisheries.

In this paper we have identified several new ideas for alternative development strategies that can build resilience in chronically vulnerable SIDS. These ideas warrant further study, as part of providing SIDS with detailed policy analysis and technical assistance in redressing their particular challenges and needs. In this respect, this work stream on building economic resilience in SIDS can make an important contribution to improving their long-term sustainable development prospects, in line with the SAMOA Pathway and the 2030 Agenda for Sustainable Development.

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Annex 1 UNITED NATIONS LIST OF SIDS

United Nations Member States (38)	Non-UN Members/Associate Members of the Regional Commissions (20)
1. Antigua and Barbuda	1. American Samoa
2. Bahamas	2. Anguilla
3. Bahrain	3. Aruba
4. Barbados	4. Bermuda
5. Belize	5. British Virgin Islands
6. Cabo Verde	6. Cayman Islands
7. Comoros	7. Commonwealth of Northern Marianas
8. Cuba	8. Cook Islands
9. Dominica	9. Curacao
10. Dominican Republic	10. French Polynesia
11. Fiji	11. Guadeloupe
12. Grenada	12. Guam
13. Guinea-Bissau	13. Martinique
14. Guyana	14. Montserrat
15. Haiti	15. New Caledonia
16. Jamaica	16. Niue
17. Kiribati	17. Puerto Rico
18. Maldives	18. Sint Maarten
19. Marshall Islands	19. Turks and Caicos Islands
20. Federated States of Micronesia	20. U.S. Virgin Islands
21. Mauritius	
22. Nauru	
23. Palau	
24. Papua New Guinea	
25. Saint Kitts and Nevis	
26. Saint Lucia	
27. Saint Vincent and the Grenadines	
28. Samoa	
29. São Tomé and Príncipe	
30. Singapore	
31. Seychelles	
32. Solomon Islands	
33. Suriname	
34. Timor-Leste	
35. Tonga	
36. Trinidad and Tobago	
37. Tuvalu	
38. Vanuatu	

Annex 2 SUBSECTION HEADINGS IN THE SIDS ACCELERATED MODALITIES OF ACTION (SAMOA) PATHWAY OF 2014

1. Sustained and sustainable, inclusive and equitable economic growth with decent work for all
 - a. Sustainable tourism
2. Climate change
3. Sustainable energy
4. Disaster risk reduction
5. Oceans and seas
6. Food security and nutrition
7. Water and sanitation
8. Sustainable transportation
9. Sustainable consumption and production
10. Management of chemicals and waste, including hazardous waste
11. Health and non-communicable diseases
12. Gender equality and women's empowerment
13. Social development
 - a. Culture and sport
 - b. Promoting peaceful societies and safe communities
 - c. Education
14. Biodiversity
 - a. Desertification, land degradation and drought
 - b. Forests
15. Invasive alien species
16. Means of implementation
 - a. Partnerships
 - b. Financing
 - c. Trade
 - d. Capacity-building
 - e. Technology
 - f. Data and statistics
 - g. Institutional support for small island developing States
17. Priorities of the small island developing States for the post-2015 development agenda
18. Monitoring and accountability

Annex 3 LIST OF INDICATORS AND SOURCES

#	Indicator, short name	Year / range	Data points	Publisher	Source
Screen 1: Endowment structure					
1	Total labour force	2018	26	ILO-STAT	ILO-STAT
2	Gross capital formation	2018	37	UNCTAD	UNCTADStat
3	Agricultural land area	2017	37	FAO	FAOSTAT
4	Capture fisheries production	2016	37	World Bank	FAO
5	Total natural resources rents (% of GDP)	2018	30	World Bank	World Bank
6	GDP per capita	2018	37	UNCTAD	UNCTADStat
7	Share of population with access to electricity	2018	37	World Bank	Sustainable Energy for All (SE4ALL) database
Screen 2: Existing economic structure					
8	Employment by sector	2018	26	ILO-STAT	ILO-STAT
9	Value added by sector	2018	37	UN Data	National Accounts Estimates of Main Aggregates
10	Trade-to-GDP ratio	2018	26	World Bank	World Bank national accounts data, and OECD National Accounts data files
Screen 3: Positioning for future opportunities					
11	Average annual gross savings rate (% of GDP)	2014-18	19	World Bank	World Bank national accounts data, and OECD National Accounts data files
12	Average annual FDI net inflows, % of GDP	2014-18	34	World Bank	International Monetary Fund, International Financial Statistics and Balance of Payments databases, World Bank, International Debt Statistics, and World Bank and OECD GDP estimates
13	Proportion of population using internet	2017	34	World Bank	ITU-ICT Indicators Database

#	Indicator, short name	Year / range	Data points	Publisher	Source
14	Average annual research and development expenditure (% of GDP)	2014-18	6	World Bank	UNESCO Institute for Statistics
15	Average annual government expenditure on education (% of GDP)	2014-18	21	World Bank	UNESCO Institute for Statistics
16	Average annual tertiary enrolment rate (% of gross enrolment)	2014-18	15	World Bank	UNESCO Institute for Statistics
17	Average annual total patent applications, residents and non-residents, per 100,000 people	2014-18	14	World Bank	WIPO (patent applications), World Bank (population)
18	Regulatory quality	2018	36	World Bank	Worldwide Governance Indicators, 2019 update

Annex 4 LIST OF COUNTRY GROUPINGS FOR EVALUATION THRESHOLDS

Selected exporters of manufactured goods (MAN) <i>Source: UNCTAD</i>	Selected exporters of agricultural products (APE) <i>Source: UNCTAD</i>	Selected exporters of minerals and metals (MME) <i>Source: UNCTAD</i>	Selected exporters of services (SER) <i>Source: authors</i>
<ol style="list-style-type: none"> 1. Bangladesh 2. Belarus 3. China 4. Hong Kong, China 5. Taiwan, China 6. India 7. Korea, Republic of 8. Malaysia 9. Mexico 10. Morocco 11. Pakistan 12. Philippines 13. Singapore 14. Thailand 15. Turkey 16. Viet Nam 	<ol style="list-style-type: none"> 1. Afghanistan 2. Argentina 3. Belize 4. Benin 5. Cameroon 6. Côte d'Ivoire 7. Cuba 8. Ecuador 9. Ethiopia 10. Falkland Islands (Malvinas) 11. Fiji 12. Guatemala 13. Guinea-Bissau 14. Honduras 15. Kenya 16. Malawi 17. Maldives 18. Nicaragua 19. Paraguay 20. Seychelles 21. Solomon Islands 22. Somalia 23. Syrian Arab Republic 24. Uganda 25. Uruguay 	<ol style="list-style-type: none"> 1. Botswana 2. Burkina Faso 3. Chile 4. Congo, Democratic Republic of the 5. Eritrea 6. Guinea 7. Guyana 8. Kyrgyzstan 9. Mali 10. Mongolia 11. Namibia 12. Peru 13. Sierra Leone 14. Suriname 15. Tajikistan 16. Zambia 	<ol style="list-style-type: none"> 1. Antigua and Barbuda 2. Barbados 3. Belize 4. Cabo Verde 5. Djibouti 6. Dominica 7. Fiji 8. Grenada 9. Hong Kong, China 10. Lebanon 11. Macao, China 12. Maldives 13. Saint Kitts and Nevis 14. Saint Lucia 15. Seychelles 16. Singapore 17. Vanuatu

