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Remote but well connected? Neighboring but isolated? Measuring remoteness in the context of SIDS

Abstract

Remoteness is one of the main challenges for small island developing States (SIDS). However, this term is commonly used in a narrow sense, referring only to geographical distance from markets resulting in higher transportation costs. This paper argues that remoteness is a broader concept, also involving distance to financing sources and political centers. In addition, it can be aggravated or attenuated by connectivity in transportation networks or through political and cultural linkages. Moreover, with the growing weight of the digital economy, issues of access and performance of information and communication technologies gain a higher importance. The paper proposes six dimensions to study remoteness, as well as available indicators for measuring them. This expanded study of remoteness identifies areas that can be prioritized through targeted investments and appropriate policies for helping SIDS overcome the challenges of geography.

Key words: Remoteness, Distance, Geography, SIDS, Development



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1. Background

The first United Nations (UN) global conference on the sustainable development of small islands developing States (SIDS) recognized the structural disadvantages and specific vulnerabilities faced by this group of economies, including their “distance and isolation” (United Nations, 1994, p. 31). Successive conferences also highlighted their “traditional isolation”, the “limitations of isolation and remoteness”, and the “high transportation costs due to [their] geographical remoteness” (United Nations, 2005, pp. 20, 26, 83), as well as their “unique and particular” vulnerability due to the “remoteness from markets” (United Nations, 2014, p. 59).

Remoteness is only one of the numerous economic disadvantages faced by SIDS. They also face restricted opportunities to reach higher scale economies due to their small size and limited domestic markets. Because of a narrow endowment of natural resources and their dependence on international markets, they are vulnerable to external shocks. Per capita costs of public administration and infrastructure are comparatively high. Also, given their low elevation and economic reliance on the ocean, they are particularly impacted by sea level rise, ocean acidification, natural disasters and other climate change impacts. Considering these challenges, the 2030 Agenda for Sustainable Development recognized that SIDS are among the most vulnerable economies and deserve special attention for progressing along sustainable development goals (United Nations, 2015, pp. 7, 13).

However, among the many challenges faced by SIDS, remoteness remains one the most formidable. A higher distance translates into increased costs, including transportation and insurance, weakening the competitiveness of domestic products in international markets and increasing the import bill. It also means that they generally lie far from the main transportation routes, potentially making their supply of resources costly and unreliable. Additionally, infrastructure projects, such as those enabling connections to energy and communication networks, are more costly to implement and maintain. Coupled with their small economic and demographic weight, the remote location of SIDS means that they mostly drop off the radar from public and private financial flows, hindering these countries’ capacity to finance development. As noted by House (2013), the isolation of SIDS translates into important economic disadvantages: small economies of agglomeration, high freight costs and reduced competitiveness.

But are remoteness and isolation still insurmountable obstacles for SIDS? We have seen some small island economies reach high income levels based on exports, not of goods, but of financial, logistical or tourism services. Moreover, in a context where financial flows can move from one side of the planet to the other instantaneously and where a growing share of value added comes from the digital economy and intangibles, physical distance might not be the impediment it once was. On the other hand, the toll from geographic separation could also derive from cultural or political factors, from being far away from the global centers where decisions are made and where the “action” takes place. How can connectivity, both digital and in terms of transportation, alleviate the obstacles brought about by economic and social isolation?

In the economics literature, remoteness is traditionally studied as a factor increasing transaction and information-exchange costs, therefore influencing bilateral trade or investment flows. However, this variable is considered in the traditional way: as a geographical barrier increasing trade and transport costs and therefore reducing potential inter-country linkages. Classic gravity models are examples of this. For instance, see the summary presented in Baier and Standaert (2020) and the treatment of a remoteness indicator in Wei (1996) and Harrigan (2003), whose trade models use bilateral distance weighted by GDP as a proxy for remoteness. Chaney (2018), while alluding to the role of informational barriers in international trade, as well as the importance of networks and information technologies, still emphasizes the theoretical and empirical role of geographical distance. Finally, by using geographical distance as a determinant, Ho et al. (2013) and Amidi and Majidi (2020) study the impact of bilateral trade on economic growth.

Beyond trade, the economics literature has also analyzed in great detail the spatial correlation of growth and the empirical evidence indicating regional convergence and agglomeration economies. Commonly, this is studied by focusing on the role of geographical distance on economic spillovers (see, for example, Guastella

and Timpano (2010)). Interestingly, Conley and Ligon (2002) expanded the analysis to the broader concept of “economic distance”, referring to the cost of moving production factors (capital and labor).

One special case of spillovers refers to technological diffusion. Numerous studies have found evidence that remoteness has a significant influence on the spatial spillovers of innovation and knowledge, which fall rapidly as distance increases (Keller, 2004; Bottazzi and Peri, 2003; Piermartini and Rubinová, 2014). Although this has been approached mainly using geographical distance, the role of other factors, such as sociocultural or institutional linkages, has also been recognized (Keller, 2002; Caragliu and Nijkamp, 2016).

Geographical separation plays an equally prominent role in the literature studying the determinant of foreign direct investment, either from a macroeconomic perspective or by studying firm-level decisions (consider, for instance, the results in Carr et al. (2001) and Egger (2008)). However, other studies have found a significant role of other types of separation in explaining the foreign investment decision of firms, including cultural proximity (Ragozzino, 2009; Li et al., 2017), institutional disparities (Aleksynska and Havrylchuk, 2013), economic distance (Le, 2017) and linguistic overlap and technological similarities (Ly et al., 2018).

Another example of the importance of remoteness can be found in political sciences, where the role of proximity as a determinant of cross-border contagion of conflict and political instability has been extensively studied, starting with the influential work in Sambanis (2001) and Gleditsch (2002). In this literature, the channel of conflict contagion is geographic proximity, mostly defined as a shared border or a neighboring location (within a certain distance threshold). However, more recent studies have expanded the analysis to additional factors. Building on this literature, Cantu-Bazaldua (2014) analyzes the role of different proximity matrices considering factors beyond geographic distance, including cultural affinity, bilateral trade and political alliances.

Importantly, remoteness is one of the criteria included in the Economic Vulnerability Index, used to determine inclusion and graduation from the least developed country (LDC) category. In this index, remoteness is defined as the weighted average distance from closest world markets. It is calculated as the average distance to the nearest neighbors with a cumulative share of 50 per cent of world trade (exports and imports of goods and services). In addition, the indicator is adjusted for landlockedness (Committee for Development Policy Secretariat, 2015).

We argue that remoteness relates to more than just geographical distance from markets resulting in higher transportation costs. It also involves integration into transport networks, as well as political and cultural linkages. Moreover, with the growing relevance of the digital economy, access and performance of digital networks gain a greater importance. This paper presents the main dimensions of remoteness and proposes indicators for measuring them. These issues are presented in the context of the sustainable development of SIDS.

In the outcome document of the most recent global conference on SIDS, the signatory countries called on the United Nations, its specialized agencies and relevant intergovernmental organizations to “elaborate appropriate indices for assessing the progress made in the sustainable development of small island developing States that better reflect their vulnerability and guide them to adopt more informed policies and strategies for building and sustaining long-term resilience”, as well as “the tracking of progress and the development of vulnerability-resilience country profiles” (United Nations, 2014, pp. 64-65). The indicators proposed in this paper represent an effort in this direction.

From the policy perspective, the broader analysis of remoteness introduced in this paper allows a more complete monitoring of progress made in sustainable development, fully taking into consideration one of the most salient challenges faced by SIDS. More importantly, although location and geographical distance cannot be changed, the expanded definition of remoteness proposed in this paper considers factors that can be improved through targeted investment and appropriate policies. This can serve as guidance when dissecting how some small island economies have successfully developed and reached a high national income level in spite of their physical remoteness.

The rest of the paper is organized in the following order. The next section proposes a framework to organize the study of remoteness, as well as relevant statistical indicators that could be used for measuring this concept. After that, Section 3 presents recent data for SIDS along the dimensions proposed by using

standardized indices to facilitate comparison between countries and indicators. The following section explores the construction of a remoteness index summarizing the different dimensions presented. The paper concludes by highlighting the relevance of these metrics for policy analysis in SIDS and other countries.

2. Dimensions of remoteness

Some countries situated in geographically distant locations, from the point of view of the largest global markets and worldwide production centers, would not be considered isolated. Think of Australia, Brazil or South Africa: while relatively remote in geographical terms, their products are found all over the world, they are important providers of services, they frequently appear in news coverage and their political influence outweighs their relative population or gross domestic product (GDP). Other countries, on the other hand, lie in the middle of dynamic regions or close to large markets, but they are economically secluded and contribute little to regional trends. Several countries that have pursued autarky as national policy fall in this category.

These examples show that remoteness is not only a geographical construct. Instead, it is also deeply linked with other concepts, such as connectivity and global presence. Moreover, digital technologies are transforming the way economic production takes place and how societies and economies connect, and this process is changing the relative importance of distance.

This paper proposes to study remoteness as geographical distance adjusted for connectivity. All things equal, a greater distance imposes additional costs and increases the isolation from markets and people. However, a better connectivity could considerably reduce the distance premium. We could therefore have an economy that is remote but well connected (such as the three examples cited above), and also a neighboring country that remains isolated. More relevant, while a country has no control about its physical location, it can influence its connectivity through targeted investment in infrastructure and greater participation in cultural and political networks.

Both distance and connectivity are multidimensional concepts. Distance could be measured with respect to main populated areas, markets or sources of financing, for instance. Connectivity could refer to transport routes, socio-cultural linkages or digital networks, among others. This paper proposes the following dimensions to study both aspects of remoteness, including a set of relevant indicators for measuring them.

1. *Geographical distance from markets.* This is the traditional dimension of remoteness, indicating geographical proximity to other territories and separation from relevant economic centers. It will be measured through three variables: distance to nearest neighbor, distance to economic centers, and distance to trading partners.
2. *Distance from financing sources.* While distance is not an obstacle for financial flows, financial activity tends to cluster around specific centers, where most of the business and investment decisions are made. Countries far from these centers risk falling off the radar from these decisions. The indicators included in this dimension are the distance to business centers, distance from sources of foreign direct investment (FDI), and distance from senders of official development assistance (ODA).
3. *Distance from cultural and political centers.* In addition to the economic costs attached to distance, a frequently neglected burden of remoteness is the potential isolation from the centers of cultural and political power. These are the countries with a great deal of influence in defining international rules, shaping the global discourse and setting cultural trends. This dimension will be assessed as the distance to the main centers of global soft power¹ and the countries with the strongest global presence, as measured through international indicators available in the literature.

¹ An idea originally developed in Nye (2004), "soft power" refers to the ability to influence the behavior of others to get the desired outcomes through attraction and co-option rather than coercion (or "hard power"). According to the author, it relies on three pillars: political values, culture and foreign policy.

4. *Transport connectivity.* Well-developed transport links could ease the burden of distance, facilitating the inflow and outflow of products and people. Maritime, air and land connectivity are measured in this dimension.
5. *Social and political connectivity.* It is important to consider not only the physical links of a country through its transport infrastructure, but also its cultural or social connections with the rest of the world. This is a broad dimension that will be studied through indicators on the number of immigrants in the country and the stock of nationals living abroad, foreign (tertiary) students registered in the national education system and nationals studying (tertiary education) abroad, foreign diplomatic representations in the country, and membership in economic, trade, defense or other alliances.
6. *Digital connectivity.* As described above, the digital economy has the potential to mitigate many of the disadvantages of physical remoteness. However, this requires infrastructure in information and communication technology (ICT), as well as widespread access to these tools among businesses and individuals. This dimension will be assessed through three indicators: (i) Internet access of the population; (ii) international bandwidth per Internet user, which functions as a proxy of the available Internet infrastructure; and (iii) the latency rate, a measure of network performance.

Appendix B includes complete information on the variables considered, including their definition, data sources, and details on imputation methods, when relevant. It also includes summary statistics for all variables. The following section will present recent data for SIDS along the dimensions listed above, comparing it to other world regions.

3. Remoteness indicators for SIDS

The variables considered vary considerably in terms of data ranges and units of measurement. They will be transformed to a 0-100 scale through a min-max transformation to facilitate comparisons between countries and indicators.² The variables will be presented for all SIDS, as well as aggregates for relevant comparison groups.³ For more details about the SIDS group and its country composition, see Appendix A. As a guide, the visualizations use lighter colors to indicate a higher relative remoteness. Unless otherwise indicated, all data refer to 2019.

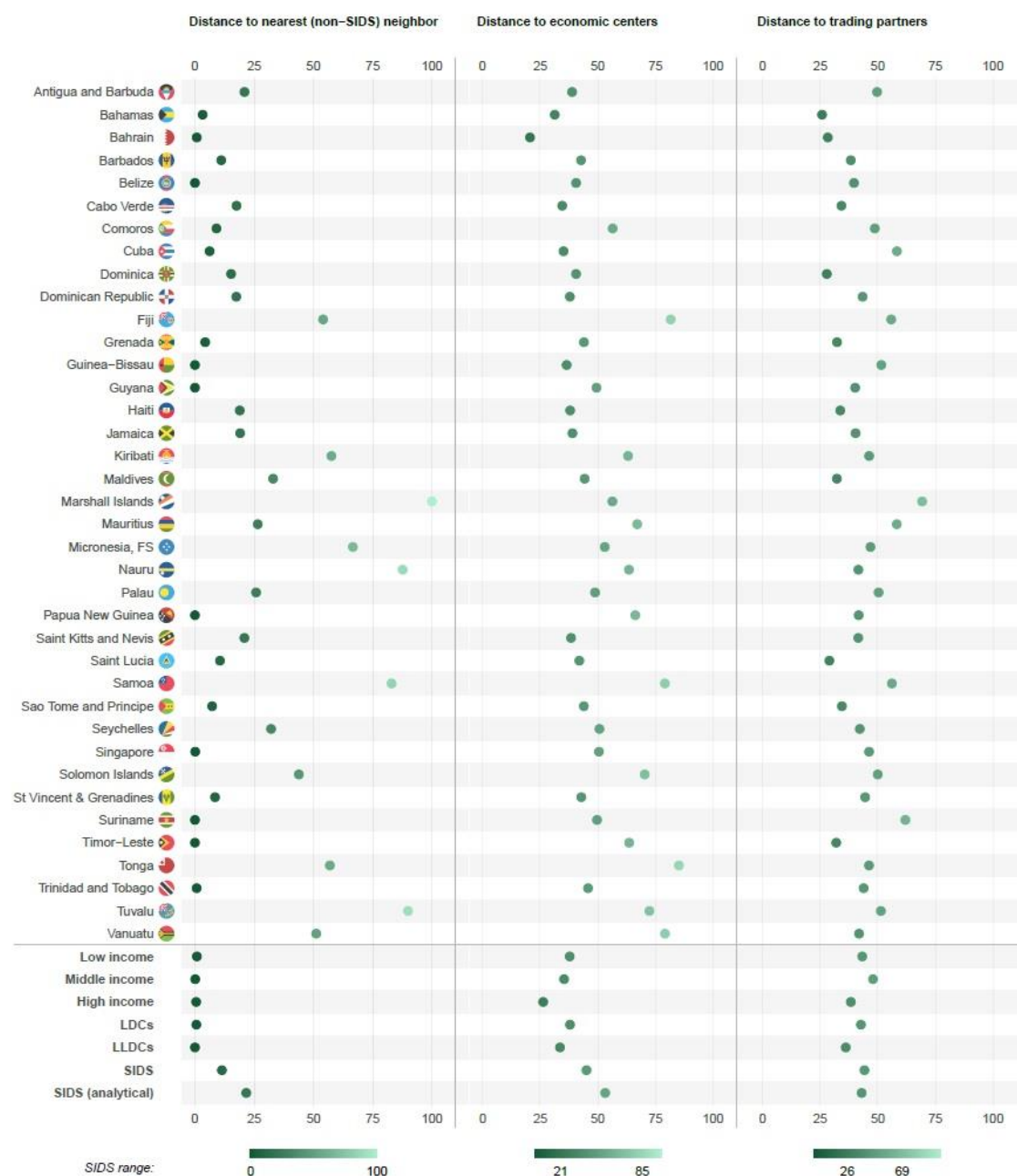
3.1 Distance from markets

Figure 1 presents the results along the first dimension, geographical distance from markets. The first column in this graph shows that, in terms of distance to nearest (non-SIDS) neighbor, SIDS are indeed situated in remote locations, relatively far away from other countries. While the global (weighted) average is a distance of only eight kms to the nearest neighbor, an average citizen from a SIDS has to travel 371 kms to the closest non-SIDS country. Moreover, there is a broad dispersion in this variable within SIDS, ranging from zero for those countries sharing a border with another country, to the 3264 kms required to cover the distance from Marshall Islands to its nearest non-SIDS neighbor (Indonesia). Tuvalu, Nauru and Samoa also register a high remoteness according to this variable.

This variable shows remoteness in purely geographical terms. However, in terms of economic opportunities for trade, investment, cross-border interactions and spillovers, it is also important to consider the distance to the largest countries in terms of their economic weight. The second column in this chart shows the average distance to all countries weighted by their GDP. In this case, SIDS are also located in remote locations, away from main economic centers. Moreover, in this case variability is more limited, since different SIDS subregions are situated in relative proximity to some large economic centers but far from others. Still, as an

² See Appendix B for summary statistics in the original units, including the data ranges. Tables with complete data in the original units were not included here, but they are available from the author.

³ Note that country aggregates are calculated as a weighted average of the corresponding variables, using population as weight.

Figure 1. Distance from markets, SIDS and selected country groups, 2019

Source: Author's calculations based on data from UNCTAD, UN Statistics Division, UN Population Division, CEPII and R package cshapes.

Note: Lighter colors indicate a higher relative remoteness. Country groups are calculated as averages using population as weights. All variables presented as indices with zero indicating the world minimum and 100 the world maximum.

average, SIDS are more remote than other country groups, such as landlocked developing countries (LLDCs) or LDCs, and especially when compared to all middle- and high-income countries. According to this indicator, the most remote SIDS is Tonga, with an average (weighted) distance of 12175 kms, followed by Fiji, Vanuatu and Samoa. However, the top five most remote countries according to this variable are not SIDS and they are mostly located in Oceania and South America: New Zealand, Australia, Chile, Argentina and Uruguay, in that order; Tonga is ranked sixth.

The third variable in this dimension also measures the average distance to all other countries, but this time weighted by their bilateral trade (exports plus imports of goods). As mentioned in the previous section,

remoteness is frequently considered as an obstacle because it increases transport costs and hinders trade. As shown in the third column of Figure 1, SIDS are not necessarily more remote than other country groups when accounting for trade flows. In fact, the average for all groups is remarkably similar, suggesting that countries tend to specialize to nearby markets. However, within the group of SIDS, there is a relatively high dispersion, ranging from Bahamas (3806 kms) to Marshall Islands (8864 kms), with Suriname, Cuba and Mauritius also registering a high trade-weighted average distance. While Marshall Islands is the SIDS member most distant from its trading partners, it is only twelfth in the world rank. The top five countries in this variable are Chile, Brazil, Peru, New Zealand and Argentina, in that order.

3.2 Distance from financing sources

Even if financial funds can be transferred from one corner of the planet to another in an instant, decisions on how to distribute financial funds are taken at the headquarters of firms and capital cities of source governments. Countries that have a low representation in those centers, because of their remoteness or other reasons, risk not being considered. In addition, geographical isolation could turn a country into a riskier or less profitable business or investment option. Because of these reasons, even in financial spheres, distance could still remain an obstacle. Figure 2 shows the situation of SIDS in the three indicators proposed for this dimension.

The three variables are correlated since the countries with the largest companies are also the main sources of other types of financing (in this case, private foreign investment and development assistance). In the three dimensions, SIDS are on average more distant from financing sources than other country groups. In particular, high-income countries and LLDCs tend to be in closer proximity to senders of financial flows.

In terms of distance from main business centers, measured according to the revenues of the largest 500 firms, Tonga is the most isolated SIDS, followed by Fiji, Mauritius, Vanuatu and Samoa. However, the global extremes are located in South America (Uruguay, Argentina, Chile, Paraguay, Brazil, Plurinational State of Bolivia), Oceania (New Zealand and Australia) and Southern Africa (Lesotho, South Africa).

The five SIDS located at the farthest distance from FDI sources are Tonga, Fiji, Vanuatu, Samoa and Solomon Islands. In terms of distance to senders of ODA, the first four SIDS are also the most remote, with Tuvalu taking the fifth place in this variable. According to both metrics, New Zealand and Australia are the most remote countries in the world, but followed closely by the mentioned SIDS.

3.3 Distance from cultural and political centers

In addition to distance from economic and financing powerhouses, remoteness also extends to other spheres. Global political values and cultural trends are defined by a few countries with a disproportionate power that extends beyond their borders and into the international agenda. In addition to their economic and financial means, the source of this power can be based on attraction and emulation (soft power) or direct pressure and intimidation (hard power). This dimension tries to complement the economic factors described in the previous two dimensions, with some measures of remoteness from the global centers of cultural and

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