

Port Connectivity

Jan Hoffmann@UNCTAD.org



51 years Review of Maritime Transport



16 years country-level LSCI

UNCTADSTAT															
A HOME		DATA	CENT	ER			COUNTR	Y PROF	ILES		VIS	SUALISA	TION		
Reports Table Chart															
Liner shipping connectivity index, annual 🗓															
Other: MEASURE I ▼ Index (Maximum 2004=100) I ↔															
YEAR	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
ECONOMY	**			+ +		**			+ +	4 +		+ +		++	
Seychelles	4.88	4.93	5.27	5.29	4.49	4.90	5.16	6.45	6.50	8.08	8.07	8.01	8.37	8.07	8.01
Sierra Leone	5.84	6.50	5.12	5.08	4.74	5.56	5.80	5.41	7.40	5.15	5.64	8.30	7.80	7.86	8.34
Singapore	81.87	83.87	86.11	87.53	94.47	99.47	103.76	105.02	113.16	106.91	113.16	117.13	118.47	121.63	133.92
Slovenia	13.91	13.91	11.03	12.87	15.66	19.81	20.61	21.93	21.94	20.82	24.25	29.64	31.31	36.10	39.32
Solomon Islands	3.62	4.29	3.97	4.13	4.16	<mark>3.96</mark>	5.57	5.87	6.07	6.04	6.90	6.64	7.36	7.50	7.59
Somalia	3.09	1.28	2.43	3.05	3.24	2.82	4.20	4.20	4.34	4.20	5.45	5.43	8.03	8.24	7.96
South Africa	23.13	25.83	26.21	27.52	28.49	32.07	32.49	35.67	36.83	43.02	37.91	41.41	35.01	38.71	40.11
Spain	54.44	58.16	62.29	71.26	67.67	70.22	74.32	76.58	74.44	70.40	70.80	84.89	80.21	88.01	90.11
Sri Lanka	34.68	33.36	37.31	42.43	46.08	34.74	40.23	41.13	43.43	43.01	53.04	54.43	61.21	70.62	72.46

years Maritime Country Profiles

Population 46.354 Millions	UNITED NATION MA	RITIME F		ADE AND D		
Population 46.354 Millions	MA	RITIME F		ADE AND D	LTLLOT MLITT	UNC <u>TAI</u>
Population 46.354 Millions	GEN	RITIVE		CDAINI		
Population 46.354 Millions	GENI	CDAL INCOL	NOFILE:	SPAIN		
Population 46.354 Millions		RAL INFOR	RIVIATION F	OK 2017		
		311 937 Millions	<	672 252 Millions current US	i\$	
(e) 15 m/km ²	🤹 Sh 🌣 46	ip building ³ 923 GT	3		Ship scrapping ³ 432 GT	
Fleet - National flag 4 1 908 Thousands DWT		eet - Owners 147 Thousands (ship ^s DWT	1	Container port throu 17 065 000 TEU	ghput ^c
	,	WORLD SH	ARES FOR 2	017		
Popula	ation	0.6	1 %			
Gross Domestic Product (current	US\$)				1.63 %	
Merchandise exports (US\$)				1.81 %	
Merchandise imports (US\$)				1.9	6 %
Coastine (km	0 10 %	0.44 %				
Fleet ownership (DWT) (4) 0.13 %					
Container port throughtput (TEU) (6)					2.27 %
Ship building (GT) (3) 0.07 %					
Ship scrapping (GT) (3) Less than 0.01% o	f the World tota	al .			
	INTERN	I JANOITAN	MERCHAND	ISE TRADE	Ľ۵	
Total merchandise trade						
(millions of US\$)	2005	2010	2015	2017	-+	10.4 %
Merchandise exports	192 644	254 418	282 274	320 063		
Merchandise imports	288 786	327 016	311 851	352 188	9	rowth rate in 2017
Merchandise trade balance	-96 142	-72 598	-29 5/8	-32 125		
Export structure by product group	o in 2017			Тор	5 partners in 2017	
(as % of total exports)				(ex	ports, millions of US\$)	
All food items					France	46 955
Ores and metals		72 %			Germany	34 899
Fuels			1 %		Italy	25 084
Manufactured goods		17 %			Portugal	22 379
Other		- cont	%		United Kingdom	21 371
	INTERNATIO	INAL TRAD	E IN TRANS	PORT SERVI	CES 🗳	
services exports by main category	2005	2010	2015	2017	-	10.4 %
Transport	-	-	13.1	(e) 12.8		
Travel	-	48.2	47.9	(e) 49.1	Trans	port services exports rowth rate in 2017
Other services		-	35.8	(e) 34.9		
Total trade in transport services 7						
(millions of US\$)	2005	2010	2015	2017		
			2023	2017		
Transport services exports	-	-	15 511	(e) 17 765		



- Propelled seagoing merchant vessels of 100 GT and above, on 1 January. Source: Clarksons Research.
- Propelled seagoing merchant vessels of 1000 GT and above, on 1 January. Source: Clarksons Research.
- TEU: Twenty Foot Equivalent Unit. Source: UNCTAD Secretariat, derived from various sources including Dynamar B.V. Publications, terminal operators and port authorities.
- Statistics presented correspond to the 6th edition of the IMF Balance of Payments and International Investment Position Manual, 2009 (BPM6, 2009).
- Source: UNCTAD Secretariat, generated from data provided by Lloyds List Intelligence. 8
 - Estimated.

Symbols for missing values:

e

- 0 Zero means that the amount is nil or negligible
- Not available or not separately reported
- Not applicable
- Not available, including no quotation Non-relevant calculation
- # Not publishable
- *** Negative accumulation of flows; Value included in regional and global totals

Abbreviations & acronyms:

DWT: Dead weight tons

- GDP: Gross domestic product
- GT: Gross tons
- TELL: Twenty foot equivalent unit

New this year Port LSCI, and port turn-around statistics



Port connectivity: Why it matters

How can we measure port connectivity?

What the data shows: First insights and trends



How can we measure port connectivity?

What the data shows: First insights and trends Transport and insurance costs of international trade, 2006–2016 (Percentage share of value of imports)



Source: UNCTAD secretariat calculations.

Note: All modes of transport; the least developed countries grouping includes 48 countries for all periods up to 2016.

Dependent variable: maritime transport costs per tonne of containerizable cargo



More liner services reduce maritime transport costs (shippers perspective)

https://link.springer.com/article/10.1057/palgrave.mel.9100073

https://www.sciencedirect.com/science/article/abs/pii/S0739885906160060



SEARCH IN TRANSPORTATION ECONOMICS VOLUME 10 PORT ECONOMICS



https://link.springer.com/article/10.1057/palgrave.mel.9100195

Better connectivity / higher index correlates with more trade



Journal

ing and

Fig. 2 Exports and the LSBCI: selected years

https://jshippingandtrade.springeropen.com/articles/10.1186/s41072-017-0019-5

Fewer transshipments lead to more exports and imports

Abstract

Since shipping connectivity reduces trade costs, which in turn improves trade, this paper aims to analyse the short- and long-run impacts of the liner shipping bilateral connectivity on South Africa's trade flows. In addition to connectivity, measured by five separate components, we also consider the effects on trade of sailing distances, the direct (air) distance and the gross domestic product (GDP) of 142 trading partners. We apply the quasi-maximum likelihood method to estimate the parameters of a dynamic panel data model. The results show that GDP, the number of common direct connections and the level of competition have a positive and significant effect on trade flows, while the number of transshipments and the direct and sailing distances have a negative and significant impact, both in the short and long run. The

Maritime Economics & Logistics

莊

ted long-run effects are stronger than the short-run effects, suggesting that rs take time to adjust their demand to changes in connectivity. The variable *um ship size* does not seem to have a positive bearing on trade, suggesting untries may not need to try to accommodate ever larger ships to maintain reign trade competitiveness.

https://link.springer.com/article/10.1057/s41278-019-00124-8

Higher Liner Shipping Connectivity leads to lower trade costs

Figure 1. Relative Impact of Different Sources of Trade Costs

(normalized regression coefficients ["betas"] against the indicator measuring the cost component)



⁽Arvis et al, 2013)

Introducing containerization leads to more trade



The Economist	Log in Register	Subscribe					
World politics Business & fina	ance Economics	Science & technology	Culture				
Free exchange The humble hero							

Containers have been more important for globalisation than freer trade



Port connectivity: Why it matters



How can we measure port connectivity?

What the data shows: First insights and trends

"Connectivity": A country's or a port's position in the global liner shipping network



https://jshippingandtrade.springeropen.com/articles/10.1186/s41072-017-0020-z



Source: Prepared for UNCTAD by Marine Traffic. *Note:* Data depict container ship movements in 2016.



"Connectivity"

- 1) Per country in a "point"
- 2) Per route between pairs of countries



"Connectivity" 1) Per country – in a "point" (170) 2) Per route – between pairs of countries



"Connectivity"

- 1) Per country in a "point" (170)
- 2) Per route between countries (170*169/2=14365)



"Connectivity" 1) Per country – in a "point" (170) 2) Per route – between pairs of countries



UNCTAD developed the Liner Shipping Connectivity Index for countries and ports, using the following 6 components:

- 1. Companies
- 2. Services
- 3. Direct connections
- 4. Ship calls per month
- 5. TEU capacity
- 6. Size of largest ship



UNCTAD developed the Liner Shipping Connectivity Index for countries and ports, using the following 6 components:

1. Companies

2.

3.

4.

5.

6



UNCTAD developed the Liner Shipping Connectivity Index for countries and ports, using the following 6 components:

1. ASIA TO USA EAST COAST Services 2. PELICAN - NEW SERVICE EASTBOUND An express direct US Gulf service 3. through Panama, linking South China and South Korea with Houston, Mobile, and Tampa allowing for competitive HOUSTON MOBILE TAMP transit times. XIAMEN 29 22 Non-direct US ports served through our 4. YANTIAN feeder network, transshipping in 27 31 33 Freeport, Bahamas. BUSAN 23 Non-direct Asia ports served through our feeder network, transhipping in 5. Yantian and Busan Copyright MSC Mediterranean Shipping Company S.A. 6. 10

UNCTAD developed the Liner Shipping Connectivity Index for countries and ports, using the following 6 components:

1.

2.

4.

5.

6.

3. Direct connections



UNCTAD developed the Liner Shipping Connectivity Index for countries and ports, using the following 6 components:

2.

5.

6.

1.

Ship calls per month



UNCTAD developed the Liner Shipping Connectivity Index for countries and ports, using the following 6 components:

1.
 2.
 3.
 4.
 5. TEU capacity
 6.



UNCTAD developed the Liner Shipping Connectivity Index for countries and ports, using the following 6 components:



6. Size of largest ship

1.

2.

3

4.

5.

UNCTAD developed the Liner Shipping Connectivity Index for countries and ports, using the following 6 components:

- 1. Companies:
- 2. Services:
- 3. Direct connections:
- 4. Ship calls per month:
- 5. Capacity ships/ year:
- 6. Size of largest ship:



Revision of methodology in 2019 in collaboration with *MDS Transmodal* Source for components: *MDS Transmodal*

UNCTAD developed the Liner Shipping Connectivity Index for countries and ports, using the following 6 components:

- 1. Companies: 57
- 2. Services: 225
- 3. Direct connections: 287 ports
- 4. Ship calls per month: 245
- 5. Capacity ships/ year: 43 mio
- 6. Size of largest ship: 20060 TEU



UNCTAD developed the Ling Connectivity Index for cour using the following 6 com

Shipping es and ports, nts:

- 1. Companies
- 2. Services
- 3. Direct connections
- 4. Ship calls per month
- 5. Capacity ships/ year
- 6. Size of largest ship

The index is generated as follows: For each of the six components, a country's / port's value is divided by the maximum value of that component in 2006, and for each country /port, the average of the five components is calculated.

This average is then divided by the maximum average for 2006 and multiplied by 100. In this way, the index generates the value 100 for the country / port with the highest average index of the five components in 2006, which was China (country) / Hong Kong (port).

"Connectivity"

- Per country in a "point"
- 2) Per route between countries (12561)



Networking

Out of 170 *169 pairs of countries: How many are connected by direct services?

Networking

Out of 170 *169 pairs of countries: How many are connected by direct services?



Networking

Out of 170 *169 pairs of countries: How many are connected by direct services?





Ways to measure bi-lateral connectivity (1)

Use national-level data: e.g. geometric average of country-level LSCI



Ways to measure bi-lateral connectivity (2)

Direct connectivity:

- Number of companies (competition)
- Number of services (transport options)
- Largest ship (infrastructure)

Ways to measure bi-lateral connectivity (3)

Position in network:

e.g. Number of options to get from A to Bwith one (or two) transshipment(s)-> number of common connections

Ways to measure bi-lateral connectivity (3)

Position in network:



CEO & Partner at SeaIntel Maritime Analysis Copenhagen Area, Capital Region, Denmark · 500+ connections · Contact info

Copenhagen Business School

Highlights



149 mutual connections

You and Alan R. both know Biju Ninan Oommen, Irene Rosberg, and 147 others



5 Mutual Groups

You and Alan R. are both in Maritime Executive, Shipping Network (40,000+ members!), and 3 others

Ways to measure bi-lateral connectivity (4)

Combine with distance:

e.g. what's the shortest distance to get from A to B with transshipments (if there is no direct service)



Ways to measure bi-lateral connectivity (...)

Combinations of the above...

(...)

- e.g. Largest ship on connections with transshipoment (Max-Min)
- Level of competition on routes with transshipment

UNCTAD LSBCI

	UNIT									
A HOME		DATA C	ENTER		CO	UNTRY PR	OFILES		1	NFOGRAPHICS DOCUMENTATION EN F
enorts Table Chart										al 😤 🤶
Actions - EE E		e *	* 17							
iner shipping bilateral conn	ectivi	ty inde	x, annua	l, 2006	-2016	1				
ther: MEASURE - Index	YEAP	3 ¥ 20:	16 🕪							
PARTNER	Albania	Algeria	American Samoa	Angola	Antigua and Barbuda	Argentina	Aruba	Australia	Bahamas	Bahrain Bangladesh Barbados Belgium Belize Benin Bermuda Brazil Brunei Darussalarm Bulgaria Cabo Verde Cambodia Cameroon Canada
ECONOMY		÷÷								
bania	_	0.175	0.102	0.113	0.105	0.179	0.106	0.185	0.180	The current version of the LSBCI includes 5 components. For any pair of
geria	0.175	-	0.176	0.223	0.189	0.234	0.193	0.235	0.229	countries A and B represented in our sample, the LSBCI is based on: 256
merican Samoa	0.102	0.176		0.193	0.181	0.200	0.187	0.233	0.199	> 1) the number of transshipments required to get from country A to country B
ngola	0.113	0.223	0.193	-	0.195	0.346	0.200	0.301	0.323	2) the number of direct connections common to both country A and B
ntigua and Barbuda	0.105	0.189	0.181	0.195	-	0.205	0.211	0.212	0.209	2) the geometric mean of the number of direct connections of country A and of
rgentina	0.179	0.234	0.200	0.346	0.205		0.217	0.332	0.355	s) the geometric mean of the number of direct connections of country A and of
ruba	0.105	0.193	0.187	0.200	0.211	0.217	-	0.229	0.223	288
ustralia	0.185	0.235	0.233	0.301	0.212	0.332	0.229	-	0.312	4) the level of competition on services that connect country A to country B 370
ahamas	0.180	0.229	0.199	0.323	0.209	0.355	0.223	0.312		5) the size of the largest ships on the weakest route connecting country A to as a size of the largest ships on the weakest route connecting country A to a size of the largest ships on the weakest route connecting country A to a size of the largest ships on the weakest route connecting country A to a size of the largest ships on the weakest route connecting country A to a size of the largest ships on the weakest route connecting country A to a size of the largest ships on the weakest route connecting country A to a size of the largest ships on the weakest route connecting country A to a size of the largest ships on the weakest route connecting country A to a size of the largest ships on the weakest route connecting country A to a size of the largest ships on the weakest route connecting country A to a size of the largest ships on the weakest route connecting country A to a size of the largest ships on the weakest route connecting country A to a size of the largest ships on the weakest route connecting country A to a size of the largest ships on the weakest route connecting country A to a size of the largest ships on the weakest route connecting country A to a size of the largest ships on the weakest route connecting country A to a size of the largest ships of the largest ships on the weakest route connecting country A to a size of the largest ships
ahrain	0.102	0.183	0.186	0.290	0.186	0.296	0.195	0.276	0.295	country B. 320
angladesh	0.100	0.125	0.173	0.224	0.114	0.251	0.123	0.265	0.215	In order to establish a unit free index, all components are normalized
arbados	0.107	0.193	0.184	0.200	0.296	0.219	0.217	0.227	0.221	using the standard formula:
elgium	0.206	0.342	0.234	0.425	0.250	0.481	0.321	0.426	0.440	Asing the standard formula, Normalized Value – (Daw, Min(Daw)) / (Max(Daw), Min(Daw))
elize	0.103	0.191	0.183	0.212	0.192	0.218	0.205	0.227	0.228	$Vormalized_Value = (Raw - Pilin(Raw)) / (Plax(Raw) - Pilin(Raw)), $ 234
enin	0.183	0.233	0.194	0.356	0.195	0.304	0.199	0.307	0.279	Inis formula rather than the Raw/Max(Raw) formula has been chosen essentially here we of the substantial and minimum which differ form the difference in the minimum and here we of the substantial and minimum which differ form the difference in the minimum and here we have a substantial and the minimum and the difference in the minimum and the mi
ermuda	0.081	0.148	0.149	0.151	0.152	0.154	0.153	0.156	0.155	values of the existence of minimum values which there income zero. If all minimum tasks and the second seco
										deperate identical normalized values
										The LSBCI is computed by taking the simple average of the five normalized components. As a consequence, the LSBCI can only take values between 0 (minimum) and 1 (maximum). As to the first component, we simply take its complement to unity that is 1- Normalized_Value to respect the correspondence between higher values and stronger connectivity.

Port connectivity: Why it matters

How can we measure port connectivity?

What the data shows: First insights and trends

A map with 900+ port LSCI



The global top 10

Liner Shipping Connectivity Index LSCI



The top

Shanghai is today the best-connected port in the world; it has overtaken Hong Kong which was number one in 2006.
 Ningbo doubled its LSCI since 2006.

- Outside China, the highest Asian LSCIs are recorded for Singapore and Busan.
- Outside Asia, the highest LSCIs are recorded for Antwerp and Rotterdam.



Thank you Mr. Jones

- Ports in smaller countries often provide transhipment services to larger neighbouring countries.
- They benefit from cabotage restrictions in neighbouring larger countries (e.g. Brazil, India, Japan, United States).
- Colombo has a higher LSCI than any Indian port, and Busan has a higher LSCI than any port in Japan.





The Jones Act is protectionism at its most shortsighted. With the economy slowing, easing trade among stateside ports is an easy pro-growth win.



Opinion | 'America First'? Kill the Jones Act Puerto Rico is importing Russian natural gas, due to this outdated law. & wsj.com

- Montevideo (Uruguay) has significantly improved its connectivity, while Santos' (Brazil) has been stagnant.
- In the Caribbean, Balboa (Panama), Caucedo (Dominican) Republic) and Kingston (Jamaika) are leading hub ports.

The Panama Cut

- The expanded Canal has led to shifts in services patterns.
- The LSCI of New York/ New Jersey and Savannah on the East Coast of North America grew by more than 20 per cent since 2016, while the leading ports on the West Coast of North America have seen their LSCI stagnate.



- The all-water route from Shanghai to the East Coast has gained competitiveness vis-à-vis the competing land-bridge and the Suez-Canal route.
- Ports in Panama itself, as well as Cartagena (Colombia) saw their LSCI increase significantly.
- There are still no major hub port on the West Coast of South America.

Widening the belt

- Chinese investments lead to additional services.
- Piraeus (Greece), operated by COSCO from China, has become the bestconnected port in the Mediterranean in 2019, ahead of Algeciras (Spain), Tanger Med (Morocco) and Valencia (Spain).
- Other ports with Chinese investments that have seen their LSCI go up include Colon (Panama), Khalifa (UAE), and Lomé (Togo).
- West African ports have attracted direct services from China, leading to larger vessels deployed on these routes.



No chicken, no egg

- The Pacific Islands are among those with the lowest shipping connectivity.
- Port Vila (Vanuatu) receives about one container ship every three days.
- In Kiribati, there is only one operator offering regular liner shipping services, with one ship arriving every 10 days.
- Many SIDS are confronted with a vicious cycle where low trade volumes discourage investments in better maritime transport connectivity, and faced with low connectivity, merchandize trade become



merchandize trade becomes costly and uncompetitive.



https://link.springer.com/article/10.1057/palgrave.mel.9100195

Fewer companies – more TEU capacity per company



Average per country. Source: UNCTAD RMT 2018, based on data from MDS Transmodal

Bigger ships – fewer services



Country averages. Source: UNCTAD RMT 2018, based on data from MDS Transmodal

Challenges for national competition authorities



No. 69

MARKET CONSOLIDATION IN CONTAINER SHIPPING: WHAT NEXT?

Over the past two years, a wave of market consolidation has transformed the global container shipping industry, leading to mergers and acquisitions between container lines, a reshuffling of shipping alliances and the expansion of shipping companies into port operations. There is potential for more consolidation, which raises the question as to the implications for market concentration levels, and whether the industry is becoming an oligopoly on certain routes

Consolidation activity in 2016-2018 reflects the industry's efforts to cope with the difficult market conditions faced since the 2008 global financial crisis. For many years, container shipping has struggled with low freight rates, dwindling earnings and poor financial returns.

There are clearly two sides to the container market consolidation story. By consolidating and joining alliances, container lines can expect to reduce costs, better manage ship capacity and enhance efficiency. These, in turn, benefit shippers, if on a given route the savings achieved by container lines translate into lower rates and improved service offerings. On the other hand, shippers, trade and ports can be negatively affected, if on a given route, consolidation results in reduced competition, constrained supply, market power abuse, and higher rates and prices. These trends call for systematic and regular monitoring and assessment of consolidation trends in container shipping.

Growing container shipping market consolidation

Since 2016, the global container shipping industry, which handles about 60 per cent of seaborne merchandise trade in terms of value, witnessed a series of developments leading to major market consolidation.1 Container lines concluded various mergers and acquisitions and formed larger strategic shipping alliances - groupings where member container lines cooperate on

with a handful of container lines dominating the market. As of January 2018, the top 15 container lines accounted for just over 70 per cent of all container ship capacity. Six months later, in June, the top 10 controlled almost 70 per cent of capacity, reflecting the completed operational integration of the new mergers

DO DO DO DO

strategic issues. This consolidation activity Between 2004 and 2018, the number of resulted in greater market concentration, companies providing services per country

This policy brief draws mainly upon the information, data and analysis reported in the UNCTAD publication, Review of Matrime Transport 2018. Relevant references and sources are available at http://unctad.org/RM (accessed 15 september 2018).



UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT

Vertical integration



Economies of scale and/or **Competition?**

The Economist November 26th 2011

Trade terms

SIR - The term "shipper" was wrongly used in your article on shipping ("Economies of scale made steel", November 12th). The shipper is the client, that is, the importer or exporter of goods. The provider of the service is the shipping line, or carrier. Furthermore, although it is true that the carriers benefit from economies of ("fa scale, which help to reduce their costs, these cost savings SW lut still need to be passed on to the client (the shipper). us ALE

The same trend of market New concentration that leads to cost savings may also lead to less competition. On routes where SIF "fa there are less than five carriers You providing liner services there is evidence that the process of Ital stri concentration leads in effect to 12t higher freight rates. So not all cost savings will be passed on abo in the form of lower freight NAT rates to the clients. Tan JAN HOFFMANN Trade facilitation section SIR No United Nations Conference on Trade and Development (UNCTAD) er] Geneva me IBN

Ho

SII

are he

in

try

Im Pal

No

Yar

ple

Case study South Africa and Namibia Imports and exports

The variable *ship size* (*MaxShipSize*) is either not significant or has a negligible value in all cases in both countries. This would confirm research suggesting that we have reached diseconomies of scale in container shipping (see for example UNCTAD 2017 and Haralambides 2019). While ships may achieve economies of scale at sea, the additional costs that have to be incurred by the ports and hinterland connections for the higher peak demand may lead to higher door-to-door transport costs. There are limits to the growth in ship sizes, and these depend on



Time spent in port and vessel sizes



Chart done by Julian Hoffmann

Time spent in port and geography

Container ships: port calls in 2018

Continuous cartogram distorting the area of the country proportionnally to its number of port calls.



Port connectivity: Why it matters

How can we measure port connectivity?

What the data shows: First insights and trends

2







Port Connectivity

Jan Hoffmann@UNCTAD.org

