

Supplementary Information for

Achieving socioeconomic development fuelled by globalization: an analysis of 146 countries

Methodological Notes:

- For renewable energy consumption (REC), we have used 2015 data as that was the latest year for which the data was available for the indicator.
- For, GCI, we have used 2001 data for approximation as data before this year is not available in the DHL GCI database.

Supplementary Table 1. Dimensions of socioeconomic development, their representing indicators and thresholds, from socioeconomic development floor (doughnut economics perspective, Raworth, 2017).

Dimensions	Indicators	Abbr.	Thresholds	Source
1. Education	Mean years of schooling for adult population	MYS	≥ 8.5	1
2. Employment	Vulnerable employment, total (% of total employment)	VEMP	$\leq 10\%$	2
3. Energy	Renewable energy consumption (% of total final energy consumption)	REC	$\geq 50\%$	2
4. Food	Food supply (kcal /person /day)	FS	≥ 2700 kcal	3
5. Gender equality	Labor force, female (% of total labor force)	FLF	$\geq 45\%$	2
6. Health	Out-of-pocket expenditure (% of current health expenditure)	OPE	$\leq 15\%$	2
7. Networks	Mobile cellular subscriptions (per 100 people)	MCS	≥ 90	2
8. Justice	Rule of Law	RL	≥ 1	4
9. Political voice	Voice and Accountability index	VAI	≥ 1	4
10. Water & Sanitation	Open defecation rate (% of population)	OD	≤ 5	5

Supplementary Table 2. Income brackets (acc. to World Bank Atlas method) of 4 Income groups as per World Bank.

(Available at <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups>)

Sl. No.	Income groups	2000	2008	2017
1	Low income (LIC)	≤ \$755	≤ \$975	≤ \$995
2	Lower middle income (LMC)	\$756-2995	\$976-3855	\$996-3895
3	Upper middle income (UMC)	\$2996-9265	\$3856-11905	\$3896-12055
4	High income (HIC)	> \$9265	> \$11905	> \$12055

Supplementary Table 3

The number of times referenced for each country is shown in the bracket. The name of the country represents the county omitted.

Table: 2000

Variable		Iceland (43)	Serbia (28)	Vanuatu (21)	Solomon Islands (18)	Sierra Leone (17)	Samoa (13)	Rwanda (13)	Belarus (12)
1. Iceland (43)	Pearson's r	—							
	p-value	—							
	Spearman's rho	—							
	p-value	—							
2. Serbia (28)	Pearson's r	0.979** *	—						
	p-value	< .001	—						
	Spearman's rho	0.976** *	—						
	p-value	< .001	—						
3. Vanuatu (21)	Pearson's r	0.852** *	0.870** *	—					
	p-value	< .001	< .001	—					

[illegible]

[illegible]

Supplementary Table 4

Table: 2008[illegible]

Table: 2008

Variable	Iceland (36)	Belarus (26)	Lithuania (24)	Samoa (21)	Suriname (17)	Latvia (15)	Paraguay (12)	Norway (11)	Gabon (11)	Rwanda (10)
Spearman's rho	—									
p-value	—									
2. Belarus (26)										
Pearson's r	0.847**	—								
p-value	<.001	—								
Spearman's rho	0.869**	—								
p-value	<.001	—								
3. Lithuania (24)										
Pearson's r	0.897**	0.909**	—							
p-value	<.001	<.001	—							
Spearman's rho	0.900**	0.849**	—							
p-value	<.001	<.001	—							
4. Samoa (21)										
Pearson's r	0.868**	0.954**	0.936**	—						
p-value	<.001	<.001	<.001	—						
Spearman's rho	0.917**	0.920**	0.904**	—						
p-value	<.001	<.001	<.001	—						
5. Suriname										
Pearson's r	0.930**	0.910**	0.963**	0.930**	—					

Table: 2008

Variable	Iceland (36)	Belarus (26)	Lithuania (24)	Samoa (21)	Suriname (17)	Latvia (15)	Paraguay (12)	Norway (11)	Gabon (11)	Rwanda (10)
me (17)										
p-value	<.001	<.001	<.001	<.001	—					
Spearman's rho	0.957**	0.880**	0.930**	0.927**	—					
p-value	<.001	<.001	<.001	<.001	—					
6. Latvia (15)										
Pearson's r	0.927**	0.927**	0.974**	0.950**	0.980**	—				
p-value	<.001	<.001	<.001	<.001	<.001	—				
Spearman's rho	0.956**	0.915**	0.946**	0.961**	0.966**	—				
p-value	<.001	<.001	<.001	<.001	<.001	—				
7. Paraguay (12)										
Pearson's r	0.939**	0.916**	0.963**	0.940**	0.992**	0.989**	—			
p-value	<.001	<.001	<.001	<.001	<.001	<.001	—			
Spearman's rho	0.974**	0.897**	0.927**	0.945**	0.983**	0.983**	—			
p-value	<.001	<.001	<.001	<.001	<.001	<.001	—			
8. Norway (11)										
Pearson's r	0.938**	0.915**	0.963**	0.939**	0.991**	0.989**	0.999**	—		
p-value	<.001	<.001	<.001	<.001	<.001	<.001	<.001	—		
Spearman's rho	0.969**	0.891**	0.923**	0.939**	0.978**	0.978**	0.995**	—		

Table: 2008

Variable		Iceland (36)	Belarus (26)	Lithuania (24)	Samoa (21)	Suriname (17)	Latvia (15)	Paraguay (12)	Norway (11)	Gabon (11)	Rwanda (10)
p-value		<.001	<.001	<.001	<.001	<.001	<.001	<.001	—		
9. Gabon (11)	Pearson's r	0.93** 9*	0.91** 6*	0.96** 2*	0.93** 9*	0.99** 1*	0.98** 9*	0.99** 9*	0.99** 9*	—	
	p-value	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	—	
	Spearman's rho	0.97** 4*	0.89** 8*	0.92** 8*	0.94** 5*	0.98** 3*	0.98** 3*	0.99** 9*	0.99** 5*	—	
	p-value	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	—	
10. Rwanda (10)	Pearson's r	0.93** 7*	0.91** 4*	0.96** 0*	0.93** 7*	0.99** 3*	0.98** 6*	0.99** 7*	0.99** 7*	0.99** 7*	—
	p-value	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	—
	Spearman's rho	0.95** 8*	0.87** 8*	0.92** 0*	0.92** 7*	0.97** 9*	0.96** 7*	0.98** 4*	0.97** 9*	0.98** 4*	—
	p-value	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	—

* $p < .05$, ** $p < .01$, *** $p < .001$

Supplementary Table 5

The number of times referenced for each country is shown in the bracket. The name of the country represents the country omitted.

Table: 2017

Variable		Iceland (46)	Belarus (15)	Vanuatu (10)	Uruguay (10)	New Zealand (10)
1. Iceland (46)	Pearson's r	—				
	p-value	—				
	Spearman's rho	—				
	p-value	—				
2. Belarus (15)	Pearson's r	0.896 ***	—			
	p-value	< .001	—			
	Spearman's rho	0.900 ***	—			
	p-value	< .001	—			
3. Vanuatu (10)	Pearson's r	0.961 ***	0.943 ***	—		
	p-value	< .001	< .001	—		
	Spearman's rho	0.948 ***	0.956 ***	—		
	p-value	< .001	< .001	—		
4. Uruguay (10)	Pearson's r	0.959 ***	0.941 ***	1.000 ***	—	
	p-value	< .001	< .001	< .001	—	
	Spearman's rho	0.947 ***	0.955 ***	1.000 ***	—	
	p-value	< .001	< .001	< .001	—	
5. New Zealand (10)	Pearson's r	0.955 ***	0.939 ***	0.995 ***	0.995 ***	—
	p-value	< .001	< .001	< .001	< .001	—
	Spearman's rho	0.930 ***	0.937 ***	0.984 ***	0.984 ***	—
	p-value	< .001	< .001	< .001	< .001	—

* $p < .05$, ** $p < .01$, *** $p < .001$

Supplementary Table 6

Post Hoc Tests

Standard

Post Hoc Comparisons - Year

		Mean Difference	SE	t	p _{tukey}
2000	2008	-0.060	0.030	-1.988	0.116
	2017	-0.080	0.031	-2.588	0.027
2008	2017	-0.020	0.030	-0.645	0.795

Note. P-value adjusted for comparing a family of 3

Note. Results are averaged over the levels of Income group

Supplementary Table 7

Post Hoc Comparisons - Income group

		Mean Difference	SE	t	p _{tukey}
HIC	LIC	0.048	0.035	1.376	0.515
	LMC	0.129	0.033	3.881	< .001
	UMC	0.102	0.035	2.930	0.019
LIC	LMC	0.081	0.035	2.287	0.103
	UMC	0.054	0.037	1.461	0.462
LMC	UMC	-0.027	0.035	-0.770	0.868

Note. P-value adjusted for comparing a family of 4

Note. Results are averaged over the levels of Year

Supplementary Table 8

Post Hoc Comparisons - Year * Income group

		Mean Difference	SE	t	p _{tukey}
2000, HIC	2008, HIC	0.109	0.059	1.841	0.794
	2017, HIC	0.101	0.057	1.758	0.839

Post Hoc Comparisons - Year * Income group

		Mean Difference	SE	t	p _{tukey}
2008, HIC	2000, LIC	0.260	0.057	4.556	< .001
	2008, LIC	0.055	0.062	0.877	0.999
	2017, LIC	0.040	0.070	0.568	1.000
	2000, LMC	0.258	0.060	4.292	0.001
	2008, LMC	0.180	0.060	2.974	0.120
	2017, LMC	0.161	0.061	2.633	0.265
	2000, UMC	0.228	0.067	3.394	0.036
	2008, UMC	0.162	0.062	2.618	0.273
	2017, UMC	0.126	0.060	2.111	0.615
	2017, HIC	-0.008	0.054	-0.155	1.000
	2000, LIC	0.151	0.054	2.813	0.178
	2008, LIC	-0.055	0.059	-0.919	0.999
	2017, LIC	-0.070	0.067	-1.038	0.997
	2000, LMC	0.148	0.057	2.613	0.276
	2008, LMC	0.070	0.057	1.231	0.986
	2017, LMC	0.052	0.058	0.893	0.999
	2000, UMC	0.119	0.064	1.849	0.790
	2008, UMC	0.053	0.059	0.902	0.999
2017, HIC	2017, UMC	0.017	0.056	0.297	1.000
	2000, LIC	0.159	0.052	3.094	0.087
	2008, LIC	-0.046	0.057	-0.804	1.000
	2017, LIC	-0.061	0.065	-0.937	0.999
	2000, LMC	0.157	0.055	2.864	0.158
	2008, LMC	0.079	0.055	1.428	0.957
	2017, LMC	0.060	0.056	1.075	0.996
	2000, UMC	0.127	0.063	2.036	0.668
	2008, UMC	0.061	0.057	1.081	0.995
2000, LIC	2017, UMC	0.025	0.054	0.462	1.000
	2008, LIC	-0.206	0.057	-3.598	0.018

Post Hoc Comparisons - Year * Income group

		Mean Difference	SE	t	p _{tukey}
2008, LIC	2017, LIC	-0.221	0.065	-3.389	0.036
	2000, LMC	-0.003	0.054	-0.051	1.000
	2008, LMC	-0.081	0.055	-1.472	0.947
	2017, LMC	-0.099	0.056	-1.783	0.826
	2000, UMC	-0.032	0.062	-0.514	1.000
	2008, UMC	-0.098	0.057	-1.730	0.853
	2017, UMC	-0.134	0.054	-2.485	0.352
	2017, LIC	-0.015	0.070	-0.216	1.000
	2000, LMC	0.203	0.060	3.379	0.038
	2008, LMC	0.125	0.060	2.068	0.646
	2017, LMC	0.106	0.061	1.738	0.850
	2000, UMC	0.174	0.067	2.580	0.295
2017, LIC	2008, UMC	0.108	0.062	1.735	0.851
	2017, UMC	0.071	0.060	1.194	0.989
	2000, LMC	0.218	0.068	3.221	0.061
	2008, LMC	0.140	0.068	2.058	0.653
	2017, LMC	0.121	0.069	1.767	0.835
	2000, UMC	0.189	0.074	2.543	0.316
2000, LMC	2008, UMC	0.123	0.069	1.767	0.835
	2017, UMC	0.086	0.067	1.281	0.981
	2008, LMC	-0.078	0.058	-1.348	0.972
	2017, LMC	-0.097	0.059	-1.647	0.891
	2000, UMC	-0.029	0.065	-0.450	1.000
	2008, UMC	-0.095	0.060	-1.599	0.909
2008, LMC	2017, UMC	-0.132	0.057	-2.305	0.475
	2017, LMC	-0.019	0.059	-0.315	1.000
	2000, UMC	0.049	0.065	0.746	1.000
	2008, UMC	-0.017	0.060	-0.288	1.000
	2017, UMC	-0.054	0.057	-0.933	0.999

Post Hoc Comparisons - Year * Income group

		Mean Difference	SE	t	p tukey
2017, LMC	2000, UMC	0.067	0.066	1.019	0.997
	2008, UMC	0.001	0.061	0.022	1.000
	2017, UMC	-0.035	0.058	-0.601	1.000
2000, UMC	2008, UMC	-0.066	0.067	-0.987	0.998
	2017, UMC	-0.102	0.065	-1.582	0.915
2008, UMC	2017, UMC	-0.036	0.059	-0.615	1.000

Note. P-value adjusted for comparing a family of 12

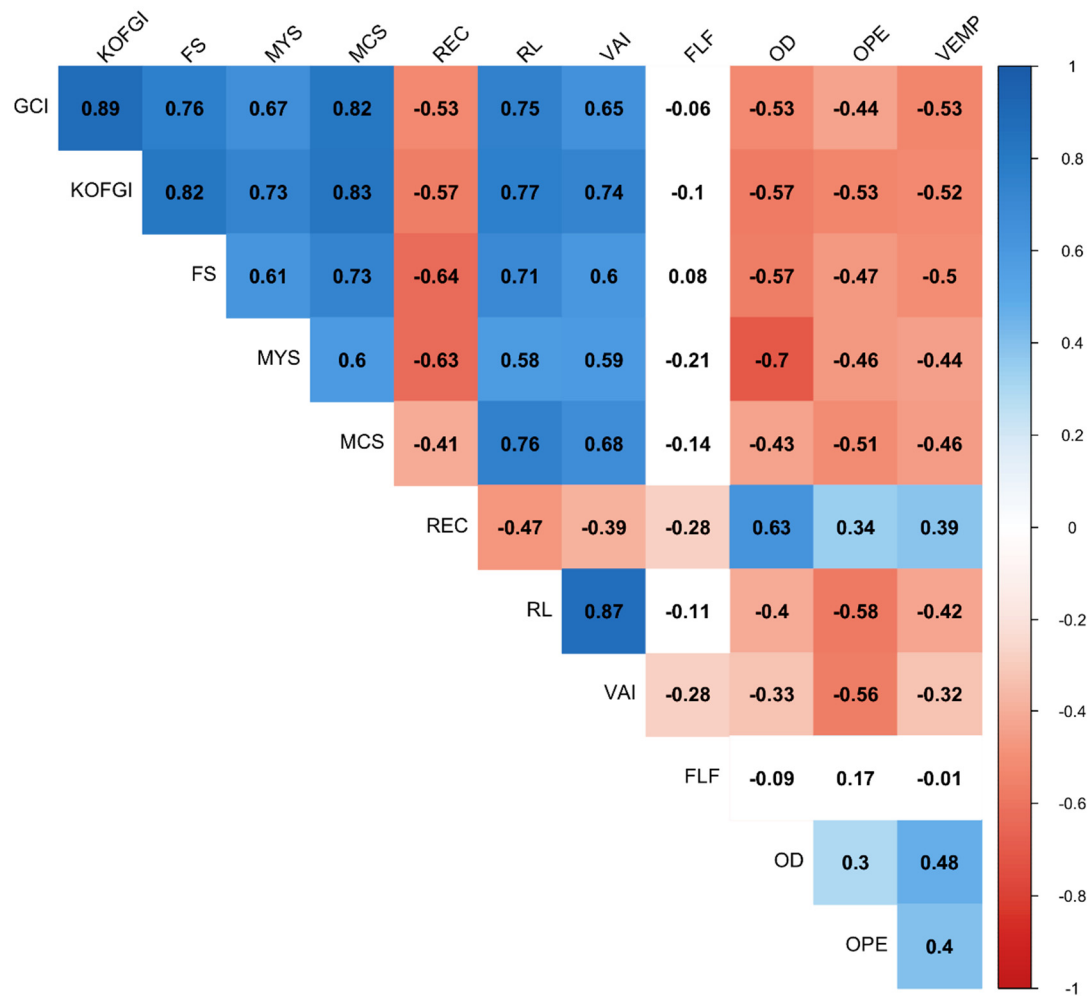
146 countries included in this study:

Afghanistan, Algeria, Angola, Argentina, Armenia, Australia, Austria, Azerbaijan, Bahamas, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Brunei Darussalam, Bulgaria, Burkina Faso, Cabo Verde, Cambodia, Cameroon, Canada, Chile, China, Colombia, Costa Rica, Cote d'Ivoire, Croatia, Cyprus, Czech Republic, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Ethiopia, Fiji, Finland, France, Gabon, Gambia, Georgia, Germany, Ghana, Greece, Guatemala, Guinea, Haiti, Honduras, Hungary, Iceland, India, Indonesia, Iran, Iraq, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kuwait, Kyrgyz Republic, Lao PDR, Latvia, Lebanon, Lesotho, Liberia, Lithuania, Luxembourg, Madagascar, Malaysia, Maldives, Mali, Malta, Mauritania, Mauritius, Mexico, Moldova, Mongolia, Morocco, Mozambique, Myanmar, Namibia, Nepal, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Portugal, Romania, Russian Federation, Rwanda, Samoa, Saudi Arabia, Senegal, Serbia, Sierra Leone, Slovak Republic, Slovenia, Solomon Islands, South Africa, Spain, Sri Lanka, St. Lucia, St. Vincent and the Grenadines, Sudan, Suriname, Sweden, Switzerland, Tajikistan, Tanzania, Thailand, Timor-Leste, Trinidad and Tobago, Tunisia, Turkey, Uganda, Ukraine, United Arab Emirates, United Kingdom, United States, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zambia, Zimbabwe,

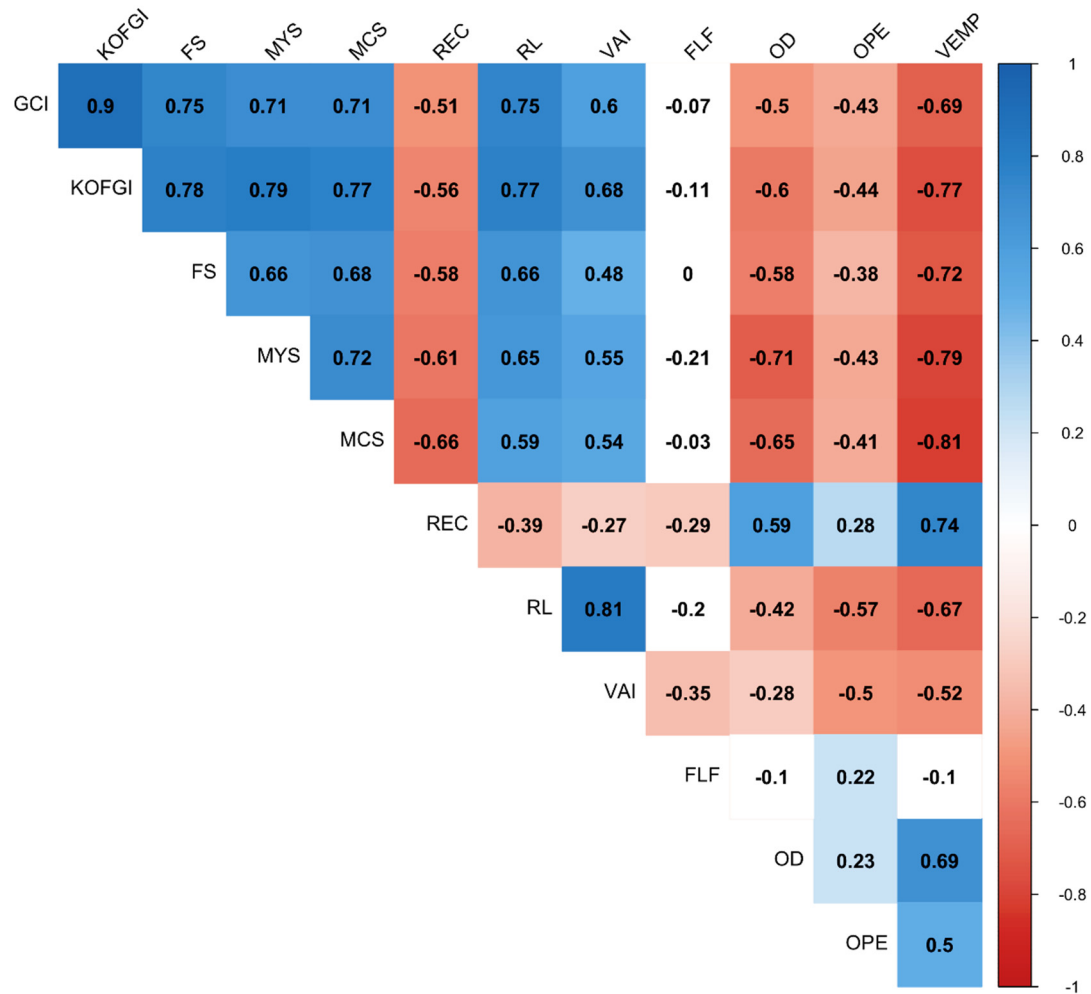
34 large economies selected:

Algeria, Argentina, Australia, Bangladesh, Bolivia, Brazil, Burkina Faso, Cabo Verde, Canada, China, Costa Rica, Denmark, Egypt, Ethiopia, France, Germany, Guinea, Iceland, India,

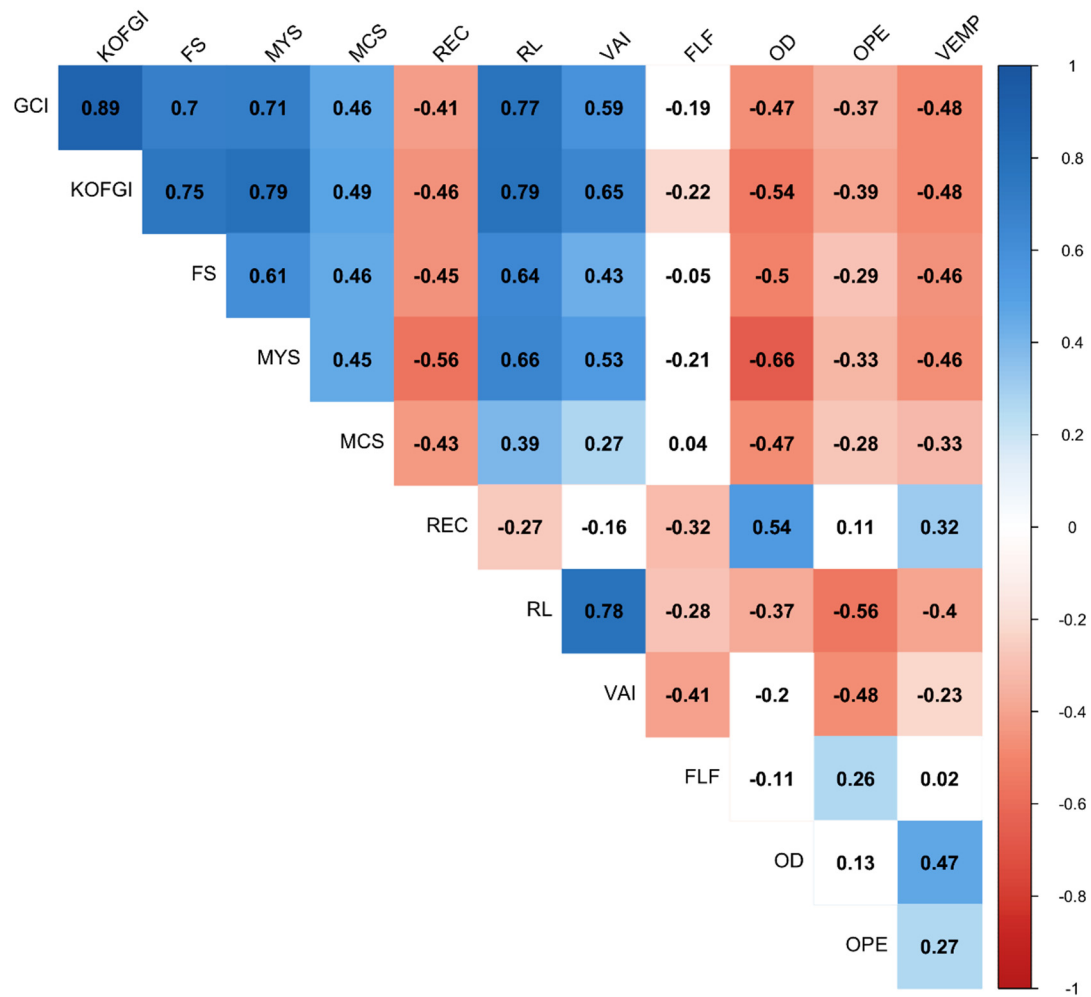
Indonesia, Japan, Malaysia, Mexico, Mongolia, Norway, Pakistan, Philippines, Russian Federation, Rwanda, Saudi Arabia, South Africa, Switzerland, United Kingdom, United States.



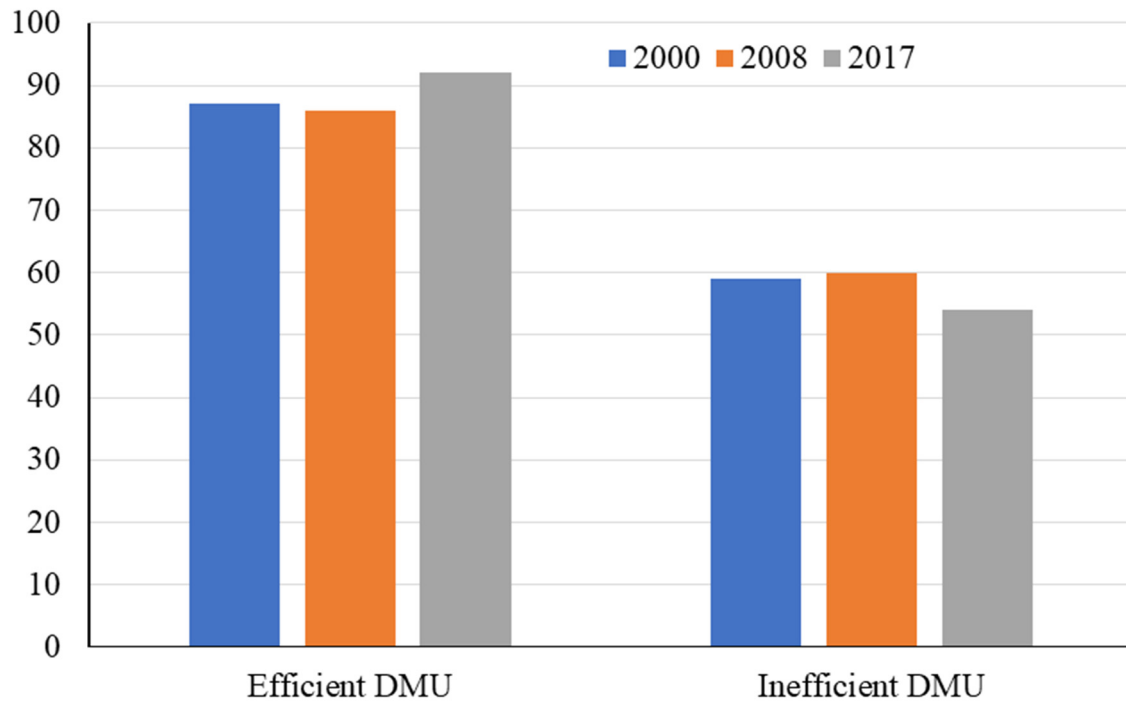
Supplementary Fig 1a. Association between globalization (n=2, used as inputs) and socioeconomic development (n=10, used as outputs) indicators through Spearman correlation in countries (n=146) of the world (for the year 2000).



Supplementary Fig 1b. Association between globalization (n=2, used as inputs) and socioeconomic development (n=10, used as outputs) indicators through Spearman correlation in countries (n=146) of the world (for the year 2008).

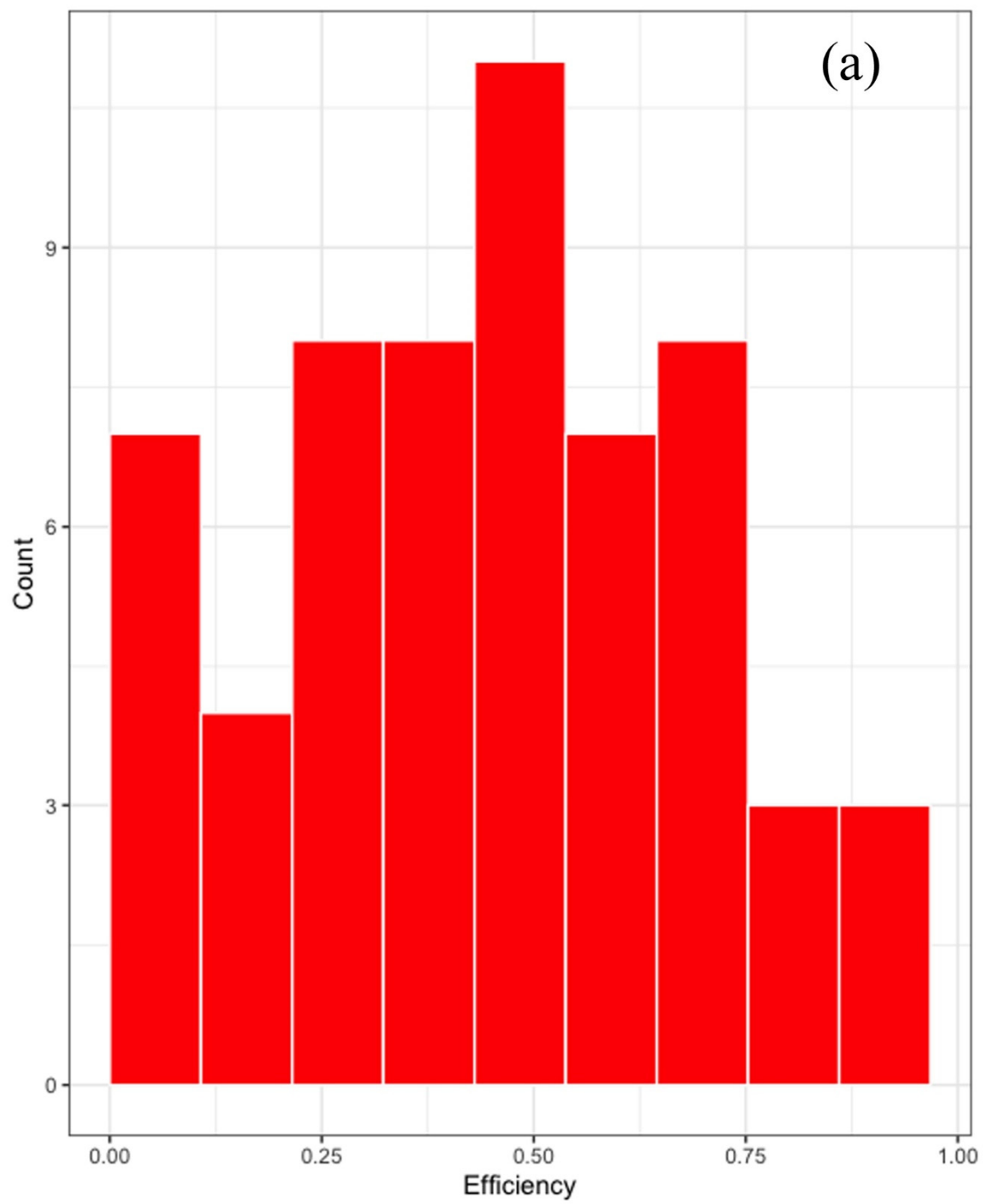


Supplementary Fig 1c. Association between globalization (n=2, used as inputs) and socioeconomic development (n=10, used as outputs) indicators through Spearman correlation in countries (n=146) of the world (for the year 2017).

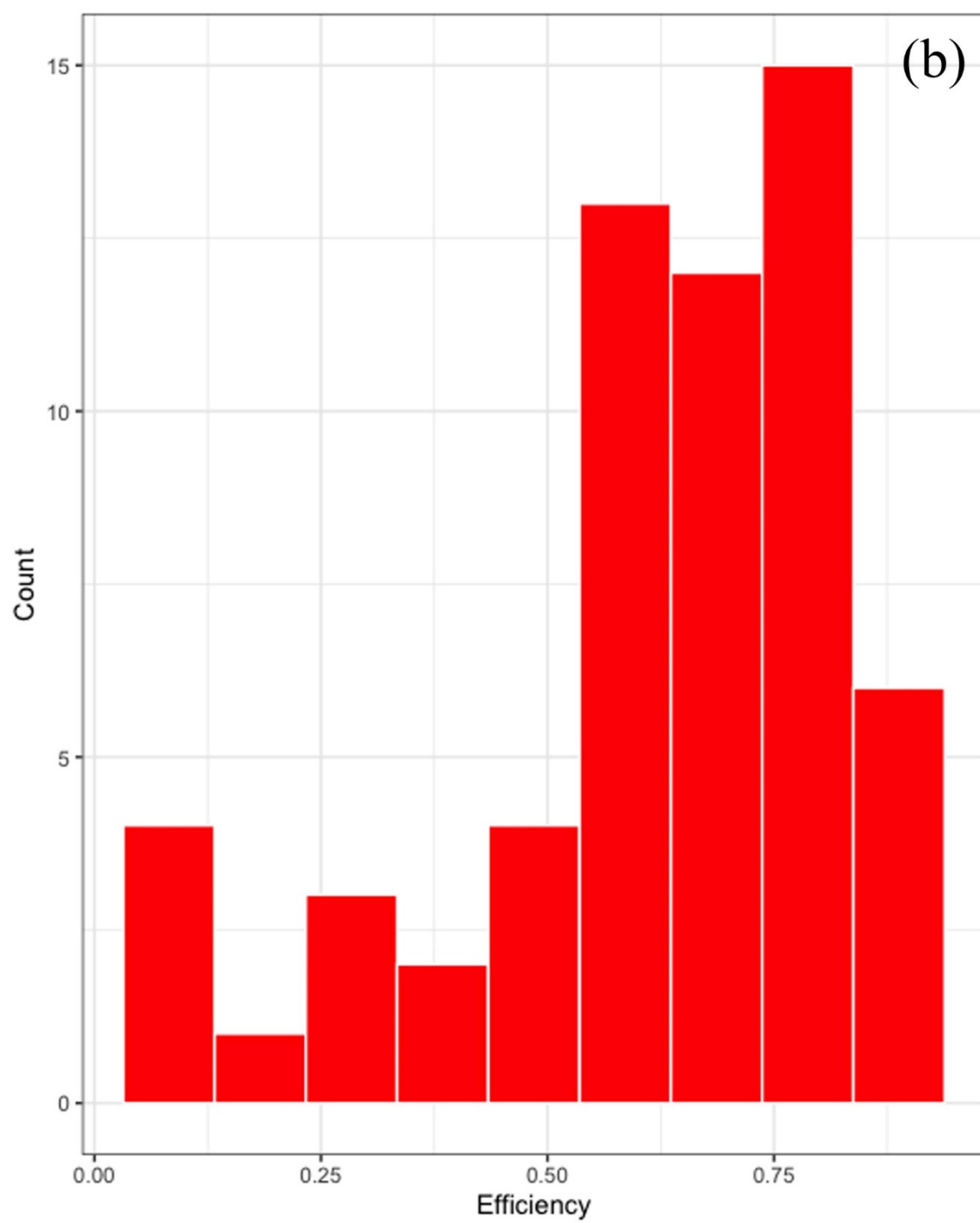


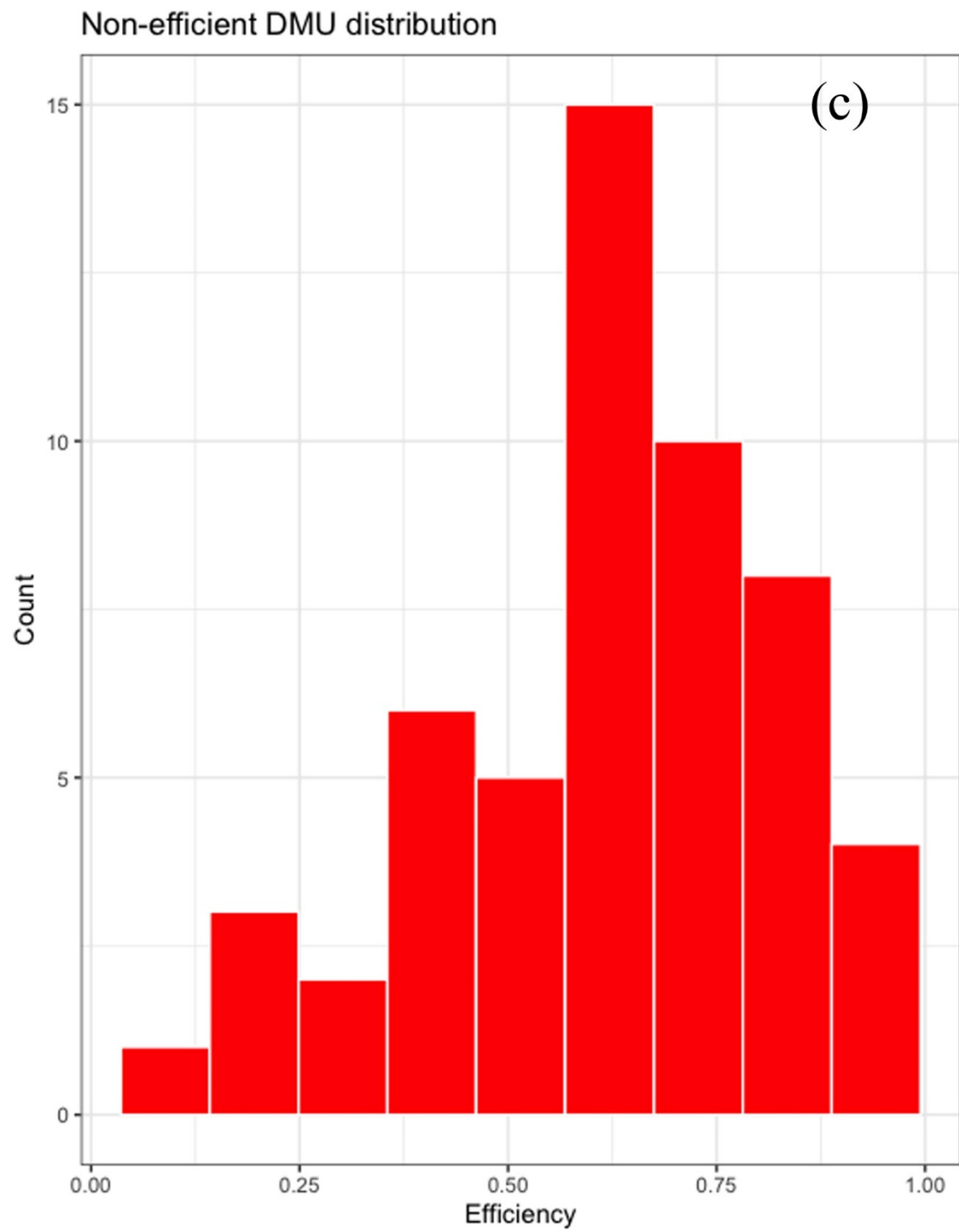
Supplementary Fig 2. Changing trend of efficient and inefficient) countries (DMUs) among 146 countries considered in this study. (a, b & c: 2000, 2008 & 2017) It shows that the number of efficient DMUs is increasing as well as inefficient DMUs are decreasing slowly.

Non-efficient DMU distribution



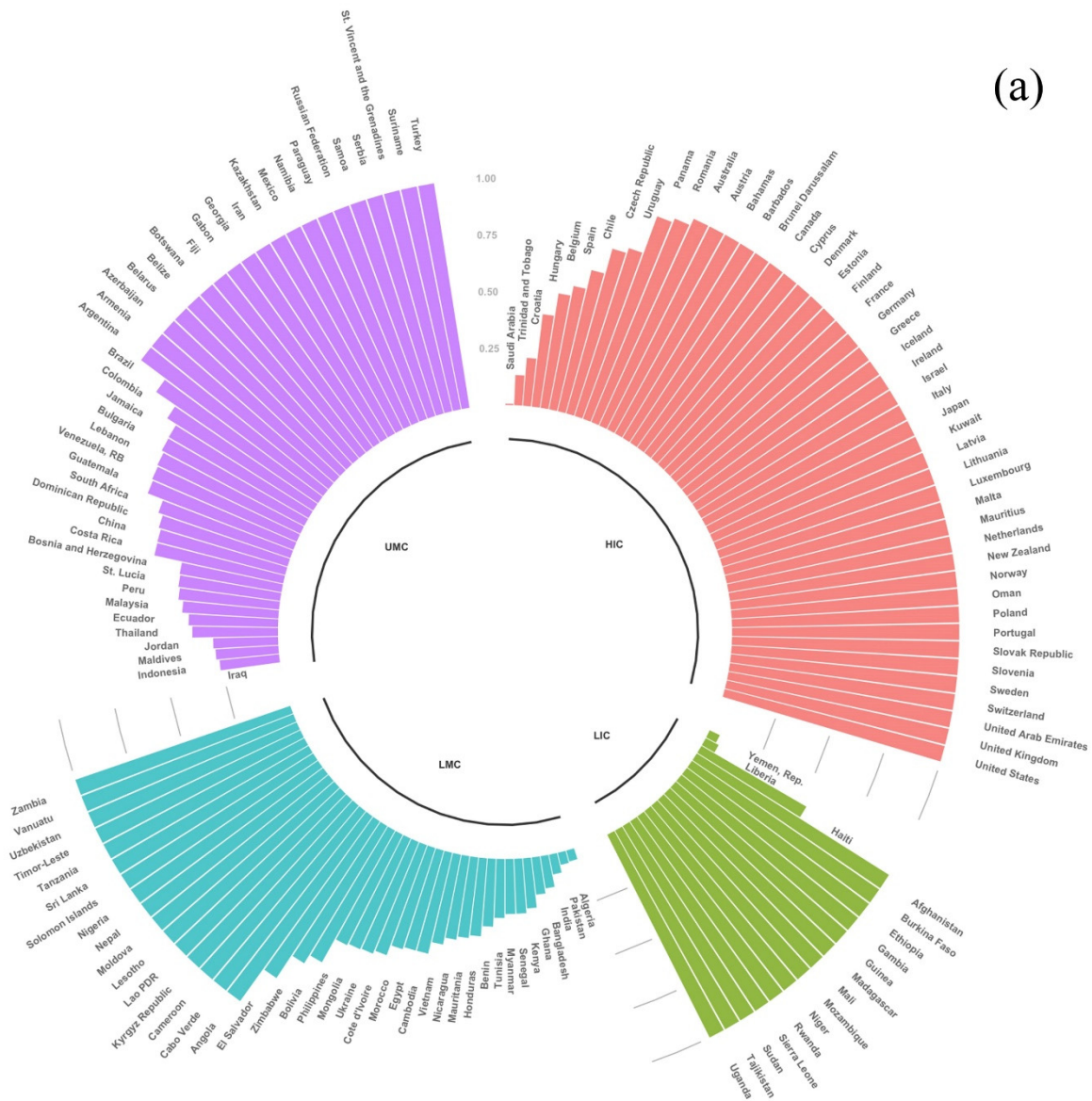
Non-efficient DMU distribution



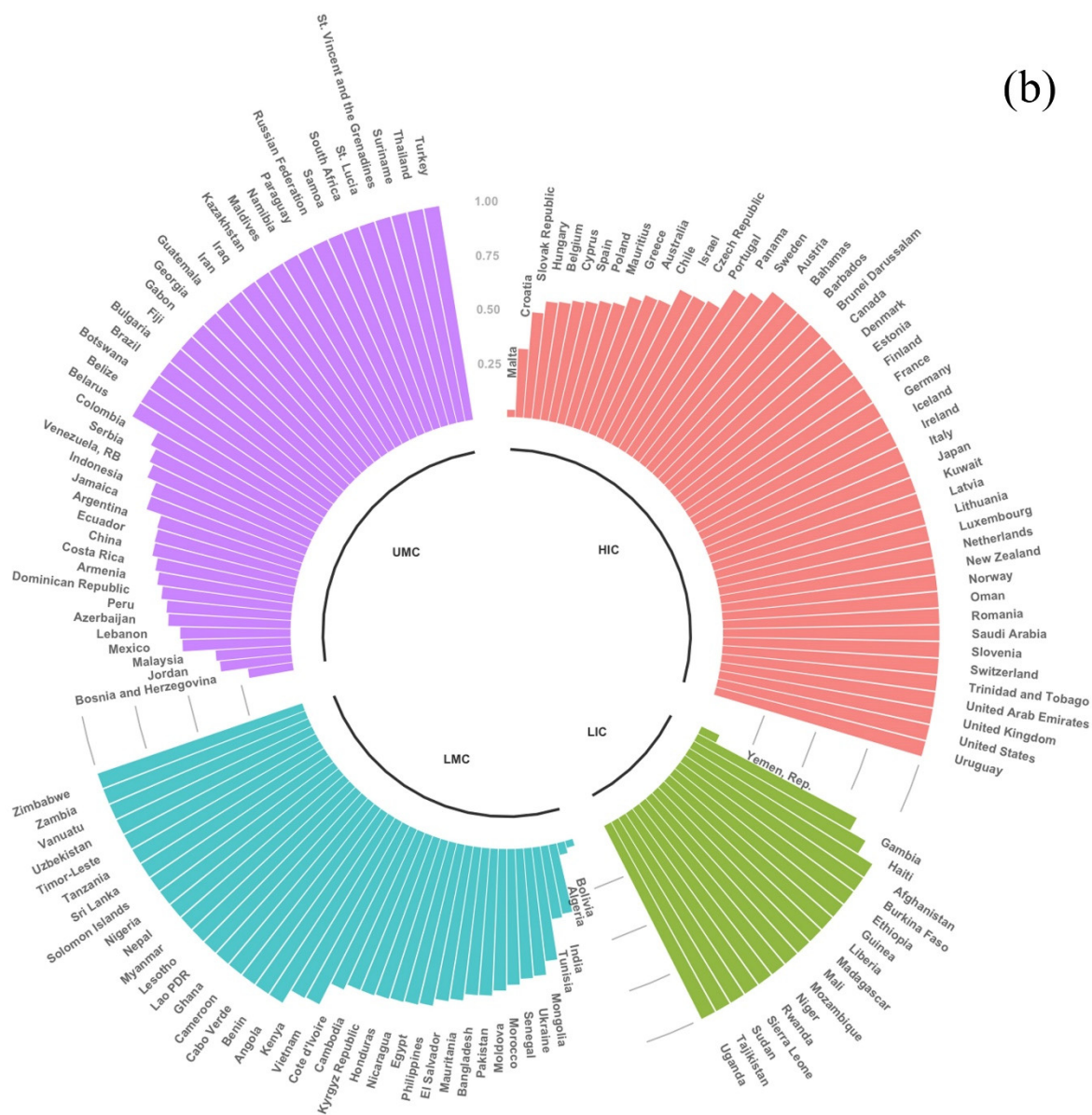


Supplementary Fig 3a,b,c. Distribution of efficiency scores of non-efficient DMUs (a, b & c: 2000, 2008 & 2017).

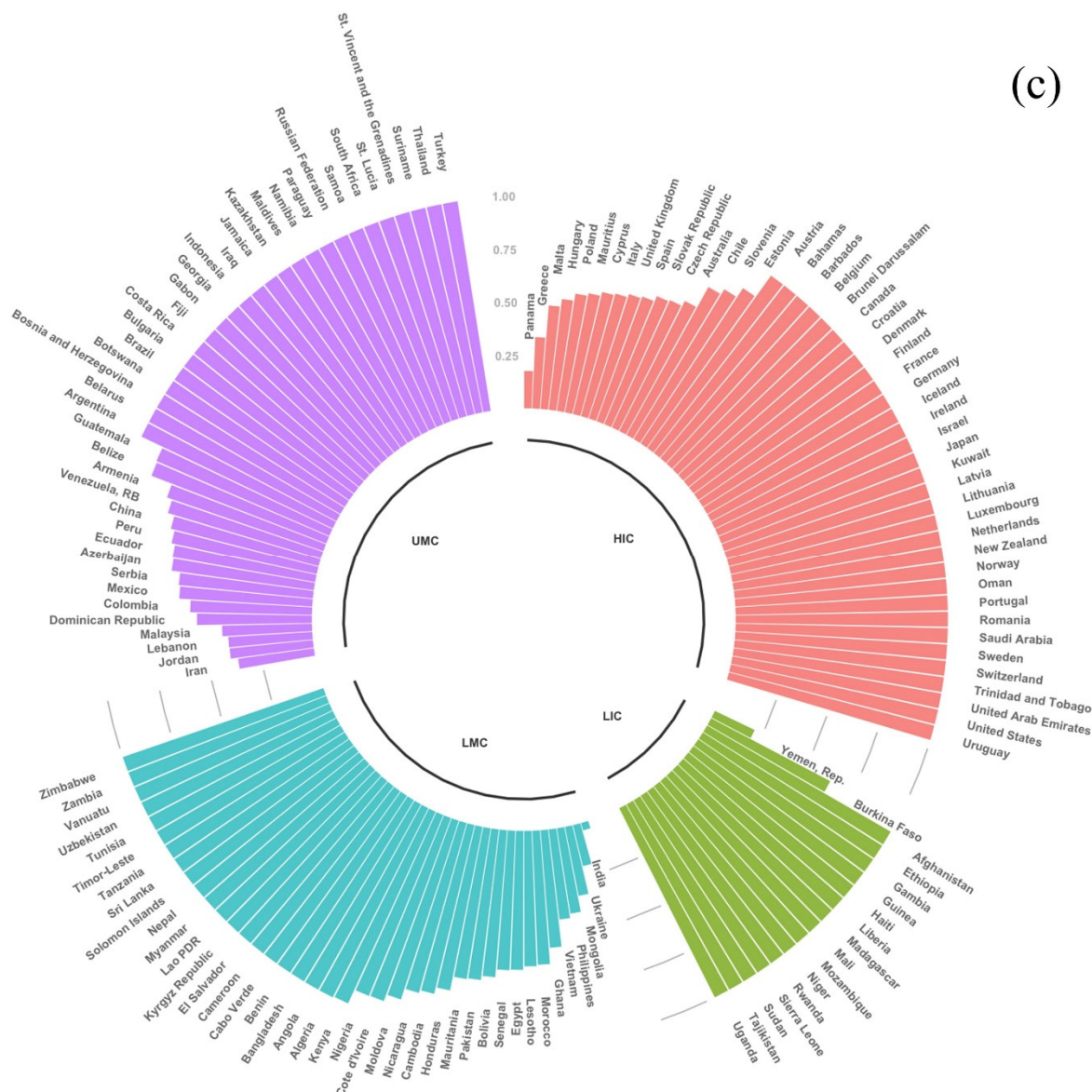
(a)



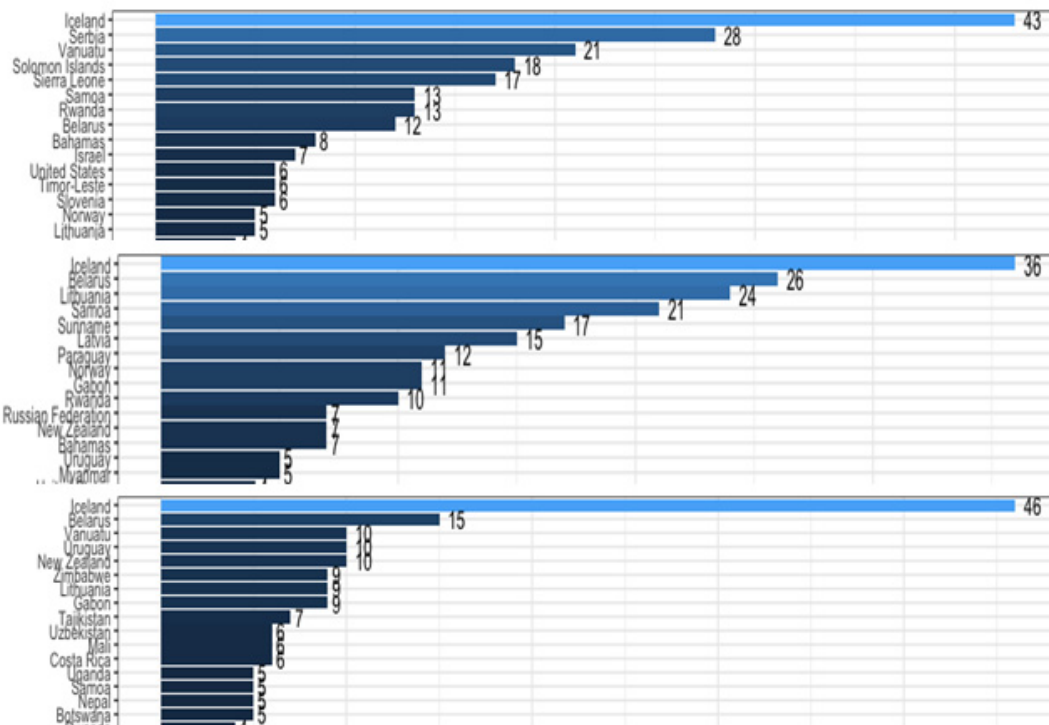
(b)



(c)



Supplementary Fig 4a,b,c. Distribution of countries in increasing efficiency with DEA, clustered into 4 income categories, LIC – *low income* (green), LMC – *lower middle income* (sky), UMC – *upper-middle-income* (violet) and HIC - *high income* (orange) of the world bank. (a, b & c: 2000, 2008 & 2017). The grouping of countries has been selected on the income category of the respective years (i.e., 2000, 2008 and 2017). It is visible that LMC and UMC have a higher share of inefficient DMUs. (a, b & c: 2000, 2008 & 2017)



Supplementary Fig 5. Ranking of countries acting as peers in reference sets (a, b & c: 2000, 2008 & 2017). Efficient DMUs which have been used as a peer for >5 times, has been shown here.

References:

- (1) Human Development Reports. UNDEP (available from <http://hdr.undp.org/en/data>)
- (2) World Development Indicators. World Bank (available from <https://datacatalog.worldbank.org/dataset/world-development-indicators>)
- (3) FAOSTAT. FAO, UN. (available from <http://www.fao.org/faostat/en/#data>)
- (4) The Worldwide Governance Indicators, 2020 Update. (available from www.govindicators.org)
- (5) Joint Monitoring Programme for Water Supply, Sanitation and Hygiene. WHO-UNICEF (available from <https://washdata.org/>)

Note: Since the data files of results are very long, we are choosing not to submit them. However, they are available from the corresponding author upon request.