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Innovation score and GDP per capita – 2011

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There is a clear linear association between the global innovation score and the GDP per capita for the 125 countries under consideration. The high correlation coefficient (r = 0.85) indicates a strong association.

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Seventy two percent of the variation of the innovation index are explained the bv variation of the GDP per capita ($R^2 = 0.72$). confirms This the results of the 2009 ranking, although the sources, the methods and the panel of countries used are different.



dots would coincide exactly with the straight line, which is not the case.

The analysis of residuals — a residual being the difference between the actual innovation

score and the corresponding value of the line of fit reveals that some countries endowed with comparatively high GDP per capita score low in innovation, and vice-GDP verse. per capita is not all — it explains 72% of the innovation score variation ($R^2 = 0.72$)

The chart shows the logarithms of the two variables, GDP per capita on the X-axis, and the innovation score on the Y-axis. The choice of the logarithm transformation is justified by the greater simplicity of the line of fit — the red straight line —, compared to the curve that the original information would produce, and by the possibility to further understand the information behind the data by looking at the residuals.

The first evidence rendered by the chart is that high innovation indexes emerge in countries that enjoy higher GDP per capita : as the latter grows by 100 units, the innovation index climbs 16. This fact invalidates, at least partially, the popular claim that necessity is the mother of invention. In reality, you need resources to indulge into innovation — poverty is a hindrance, not a helper. However, this does not tell the full story, otherwise the data —; some other factors must be there to explain the remaining 28%.

There is a set of countries which score higher on innovation than what their GDP per capita would entitle them to. In descending order the top ten are : China, Viet Nam, Moldova, Hong Kong, India, Sweden, Singapore, South Korea, Switzerland and Estonia. Five out of these 10 countries enjoy GDP per capita indexes that are multiples of the overall median (from 3.3 times for Korea to 10.5 for Switzerland) they are in line with the general association between GDP and innovation. However, 5 other countries are below the median (the GDP per capita of Viet Nam is only 19% of the median, and China's is 70%). It is thus established that comparatively poor economies mav succeed in achieving relatively high innovation scores. Assuming that innovation is a lever to improve economic



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well-being, poor countries need not lose hope — innovation is not out of reach.

At the opposite end, residuals reveal that a number of countries have an innovation performance below their GDP entitlement. The 10 lowest performers are in ascending order : Algeria, Venezuela, Brunei, Kuwait, Sudan, Greece, Yemen, Trinidad and Tobago, Syria and Kazakhstan. Six countries enjoy GDP per capita that are a multiple of the median, ranging from 1.4 times for Kazakhstan to 8.7 time for Kuwait. Four have a fraction of the median : from 17% for Yemen to 71% for Algeria. This is a mirror reflection of the situation portrayed in the last paragraph : notwithstanding enviable opportunities offered by comparatively high GDP, some countries waste their chances of attaining correct innovation indexes.

In summary, rich countries are more adept to achieve high innovation through a generous provision of education, infrastructures, administrative and political enabling environments, and financial and material support. However, The oil-rent rich countries and the largest world economies do not score impressively well. The historian Toynbee is probably right when sustaining that too much hardship crushes the ability to prosper, whilst too easy a life breeds indolence and complacency, thus preventing great achievements. Success, at least for civilizations, said Toynbee, favors those who live in a mildly hostile environment that stimulates them to reach out and accomplish prowess.

Rank	(Corre Country	ation of Score	innovation with GDP 2010	wealth) Population 2011	GDP per canit
	Country	00010	(\$US billion 1)	(thousand)	(\$US thousand
80 125	Albania Algeria	30.45 19.79	10.6 143.6	3,269 36,243	3,24
58	Argentina	35.36	332.2	41,819	7,9
21	Armenia Australia	33 49.85	8.3 842.8 ²	3,188 23,472	2,6
19	Austria	50.75	338.9	8,825	38,40
46	Bahrain	37.8	40 18.8 ²	1,328	4,00
97	Bangladesh Rolaium	28.05	90.2	151,574	5
118	Benin	23.81	421.2	9,134	6
112	Bolivia Bosnia and Herzegovina	25.44	17.8	10,157	1,7
79	Botswana	30.51	13.4	2,041	6,5
47	Brazil Brunei Darussalam	37.75	1881.1	199,684 409	9,4
42	Bulgaria	38,42	43	7,744	5,5
120	Burkina Faso Cambodia	23.14 25.46	7.9 10.2	16,998 14 369	4
103	Cameroon	26.95	20.2	20,122	1,0
8 38	Canada	56.33 38.84	1418.2	35,722	39,7
29	China	46.43	5296.4	1,366,963	3,8
71 45	Colombia Costa Rica	32.32	259.6 31.1	47,453 4 799	5,4
117	Côte d'Ivoire	24.08	20.5	20,240	1,0
44 28	Croatia Cvprus	37.98	54.8 22.8 ²	4,573	11,9
27	Czech Republic	47.3	173.1	10,925	15,8
6 93	Denmark Ecuador	56.96 28.75	279.7 53.1	5,804 14,861	48,1
87	Egypt	29,21	197.2	83,133	2,3
90 23	El Salvador Estonia	29.14 49.18	19.6 16.8	6,332 1,400	3,1
121	Ethiopia	22,88	26.8	85,076	3
5 22	Finland France	57.5 49.25	215.2 2306 5	5,644 66.600	38,1 34.6
73	Georgia	31.87	10.5	4,473	2,3
12 70	Germany Ghana	54.89 32.48	2981.9 28 2	86,457 25.095	34,4
63	Greece	34.18	274.7	11,969	22,9
86 61	Guatemala Guvana	29.33 34.83	37.1	14,878 761	2,4
98	Honduras	27.81	13.9	7,824	1,7
4 25	Hong Kong (SAR), China Hungary	58.8 48.12	202.2	7,387	27,3
11	celand	55.1	11.3	336	33,8
62 99	ndia Indonesia	34.52 27.78	1557.8	1,250,232 244,191	1,2
95	ran	28.41	301.7 ²	75,579	3,9
13	ireiand Israel	54.1 54.03	183.7 195.8	4,656	25,1
35	Italy	40.69	1848.3	64,454	28,6
92 20	Jamaica Japan	28.88	4953.3	2,806 134,887	4,4 36,7
41	Jordan	38.43	24.8	6,363	3,9
84	Kenya	29.15	28.8	41,777	6
16	Korea, Republic	53.68	914	49,424	18,4
52 85	Kyrgyzstan	29.79	4.2	2,827 5,444	48,2
36	Latvia	39.8	21.6	2,340	9,2
49	Lithuania	38,49	30.3	4,311 3,436	9,5
17	Luxembourg	52.65	49.6	536	92,6
113	Madagascar	25.41	0.2 7.9	2,109	3,0
108	Malawi	25.96	4.6	15,435	2
107	Malaysia Mali	26.35	214.3	29,029	5
53	Mauritius	36.47	8.8	1,325	6,6
39	Moldova, Republic	38.66	5.2	3,626	1,4
68	Mongolia	33.4	5.5	2,819	1,9
78	Namibia	30.74	02.2	2,336	2,5
9	Netherlands	56.31	705.8	17,331	40,7
110	Nicaragua	25.78	5.9	4,370	23,2
122	Niger	21.41	5 174 E	16,093	3
90 18	Norway	52,6	373.4	5,149	72,5
57 10 ⁴	Oman Pakistan	35.51	42.0 ²	2,861	14,6
77	Panama	30.77	24.1	3,617	6,6
74 82	Paraguay Peru	31.17	16.6 139 e	6,633 20,720	2,5
91	Philippines	28.98	179.8	95,287	1,8
43 33	Poland Portugal	38.02 42.4	422.2 205 Q	39,670 11 198	10,6
26	Qatar	47.74	89.6 ²	1,872	47,8
50 56	Romania Russian Federation	36.83 35.85	145.6 1333 3	22,140 147 100	6,5 9.0
109	Rwanda	25.86	5.1	10,982	4
54 100	Saudi Arabia Senegal	36.44 27.56	342.4 ² 11.7	28,251 12,786	12,1
55	Serbia	36.31	35.3	10,181	3,4
3 37	ാണgapore Slovak Republic	59.64 39.05	200.6 80.2	5,285 5,625	37,9
30	Slovenia	45.07	43	2,122	20,2
59 32	Spain	35.22 43.81	327.7 1268	50,767 48,831	6,4 25.9
82	Sri Lanka Sudan	30.36	44.6	21,367	2,0
101	Swaziland	20.30	55.9 3.3	44,814	2,7
2	Sweden	62.12	412.6	9,940	41,5
1 115	Syrian Arab Republic	24.82	4/1.9 53.2	8,077 20,907	58,4
116	Tajikistan Tanzania	24.5	5.1	7,026	7
48	Thailand	∠o.88 37.63	20.8 287.3	46,402 70,739	4,0
72	Trinidad and Tobago	32.17	18.4	1,364	13,4
66 65	Turkey	33.89 34.11	39.9 662.4	10,725 74.311	3,7
106	Uganda	26.37	15.3	34,625	4
60 34	Ukraine United Arab Emirates	35.01 41.99	124.3 209.8 °	46,759 7.896	2,6
10	United Kingdom	55.96	2023.6	65,347	30,9
7 64	United States Uruquay	56.57 34.18	13138.2 36 3	325,102 3.506	40,4
102	Venezuela	27.41	349.4	29,741	11,7
51 123	Viet Nam Yemen	36.71	93.3 24.0 ²	89,959 24 877	1,0
114	Zambia	25.27	14.6	13,525	1,0
119	∠imbabwe Median	23.54 34.18	6.7	12,838	5 5 5