Book Review

A Review of "The Global Innovation Index 2014: The Human Factor in Innovation" (Editors: Soumitra Dutta, Bruno Lanvin and Sacha Wunsch-Vincent)

Dutta, S.; Lanvin, B.; and Wunsch-Vincent, S. (eds.) 2014. The Global Innovation Index 2014: The Human Factor in Innovation. Cornell University, Ithaca, New York, NY, USA; Institut Européen d'Administration des Affaires (INSEAD), Fontainebleau, Île-de-France, France; and World Intellectual Property Organization (WIPO), Geneva, Switzerland. Available: <http://www.globalinnovationindex.org/userfiles/file/reportpdf/GII-2014-v5.pdf>.

Dobri Atanassov Batovski

Department of Communication and Computer Network Technology
Vincent Mary School of Science and Technology
Assumption University of Thailand
E-mail: <dbatovski@au.edu>

The Global Innovation Index 2014 (GII 2014) is a joint publication between: Cornell University, Ithaca, New York, NY, USA; Institut Européen d'Administration des Affaires (INSEAD), Fontainebleau, Île-de-France, France; and World Intellectual Property Organization (WIPO), Geneva, Switzerland (international standard serial sumber (ISSN): 2263-3693; and international standard book number (ISBN): 978-2-9522210-6-1).

It was launched globally on 18 July 2014 in Sydney, Australia, in the context of the Business 20 (B20) / Group of Twenty (G20) summit preparations.

The different chapters of GII 2014 have been written by the following authors sorted alphabetically by their last name: Ilham Bennani, Alexandra L. Bernard, Marwan Berrada, Ahmad Bin Byat, Nour-Eddine Boukharouaa, Abdelhak Chaibi, Salma Dinia, Soumitra Dutta, Abdesselam El Ftouh, Omar Elyoussoufi Attou, Adil El Maliki, Rafael Escalona Reynoso, Karima Farah, Naushad Forbes, Leonid Gokhberg, Bruno Lanvin, Yassine Ouardirhi, Valentina Poliakova, Michaela Saisana, Andrea Saltelli, Martin Schaaper, Richard Scott, Sibusiso Sibisi, Osman Sultan, Stéphan Vincent-Lancrin, David Walwyn and Sacha Wunsch-Vincent.

The total number of pages in GII 2014 is 426 pages including initial pages (26 pages), 8 chapters (132 pages) and 5 appendices (268 pages). Blank even pages iv, viii, x, xii, xvi, xxii, xxvi, 2, 40, 52, 76, 84, 92, 100, 112, 122, 132, 134, 136, 284, 286, 370, 372, 386, 388 and 394 are used for space-filling and content separation.

The GII publications were initiated by Dutta and Caulkin (2007). Subsequently, GII 2008-2009 (Dutta 2009) and GII 2009-2010 (Dutta 2010) became available. Since 2011, the content expansion of the GII series was entrusted to different authors being selected in accordance with distinct annual themes. The following three releases preceded the current publication: GII 2011 (Dutta 2011, ISBN: 978-2-9522210-1-6), launched globally on 30 June 2011 in Geneva, Switzerland; GII 2012 (Dutta 2012, ISBN: 978-2-9522210-2-3), launched globally on 2 July 2012 in Geneva, Switzerland, with parallel events in Singapore and Abu Dhabi; and GII 2013 (Dutta and Lanvin 2013, ISBN 978-2-9522210-3-0), launched globally on 1 July 2013 in Geneva, Switzerland. The main GII goal is to find suitable metrics and practical ways to better describe the multiple aspects of innovation in the modern society. This can be done statistically by collecting reliable information about an extended list of indicators in addition to the basic data on published research papers and research and development (R&D) efforts.

Table 1. Distinct numbers of indicators and countries included in consecutive GII publications.

GII publication	Number of indicators	Number of countries
GII 2007	n/a	107
GII 2008-2009	Over 90	130
GII 2009-2010	Over 60	132
GII 2011	80	125
GII 2012	84	141
GII 2013	84	142
GII 2014	81	143

There is an ongoing selection process of a sub-optimal number of indicators as shown in Table 1 which also includes the number of evaluated countries throughout the years. It should be noted that in all tables that follow missing data is marked as not available (n/a).

The top layer of the GII framework consists of the average GII and the Innovation Efficiency Ratio (IER) supported by seven pillars. There are five input pillars and two output pillars. The input pillars are related to the innovative activities of a given country such as: (1) Institutions; (2) Human capital and research; (3) Infrastructure; (4) Market sophistication; and (5) Business sophistication. The output pillars are related to the results of the innovative activities within the country such as: (6) Knowledge and technology outputs; and (7) Creative outputs. The individual pillars are divided into three sub-pillars. A sub-pillar contains several individual indicators.

The average GII and the IER are obtained from two additional indices: the Innovation Input Sub-Index (IISI) - the average of the scores of the five input pillars; and the Innovation Output Sub-Index (IOSI) - the average of the scores of the two output pillars. The average GII is defined as the average of IISI and IOSI. The IER is defined as the ratio of IOSI and IISI. Therefore, it is useful in highlighting the efficiency gain of an innovation strategy. Once all the scores (0-100) or values (hard data) of a particular index/ratio/indicator are obtained for all listed countries, corresponding ranks are finally assigned. The smaller the rank number, the better the performance achieved.

The emphasis of GII 2014 is on the human factor in innovation which is related to the second pillar concerned with human capital and research (HC&R). The three sub-pillars of the second pillar are: (2.1) Education; (2.2) Tertiary education; and (2.3) Research and development. The individual indicators in each sub-pillar of the second GII pillar are listed below:

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2     Human capital and research

2.1   Education
2.1.1 Expenditure on education
2.1.2 Government expenditure on education
      per pupil, secondary
2.1.3 School life expectancy
2.1.4 Assessment in reading, mathematics,
      and science
2.1.5 Pupil-teacher ratio, secondary

2.2   Tertiary education
2.2.1 Tertiary enrolment
2.2.2 Graduates in science and engineering
2.2.3 Tertiary inbound mobility

2.3   Research and development (R&D)
2.3.1 Researchers
2.3.2 Gross expenditure on R&D (GERD)
2.3.3 QS Quacquarelli Symonds Ltd. (London,
      England, UK) university ranking
      average score of top 3 universities.
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The median scores by regional group for human capital and research (GII 2014, p. 32) show that the highest scores are obtained for Northern America (NAC, 2 countries), the European Union (EU, 28 countries), Europe (EUR, 39 countries), and Southeast Asia and Oceania (SEAO, 17 countries) followed by Northern Africa and Western Asia (NAWA, 19 countries), Latin America and the Caribbean (LCN, 22 countries), Central and Southern Asia (CSA, 11 countries) and Sub-Saharan Africa (SSF, 33 countries).

The regional approach of calculating median scores being based on the United Nations (UN) Classification (2012) of regional groups is the preferred choice in GII 2014. However, it is worth comparing also the GII ranks of countries which are members of some of the well-established business and political coalitions/groups such as B20, G7, BRICS and the Association of Southeast Asian Nations (ASEAN). Therefore, globalization involving diverse collaborations between countries from distant parts of the world can be addressed from the viewpoint of innovation effectiveness.

Table 2. GII ranks of the B20 countries.

B20 countries	GII ranks			
	2011	2012	2013	2014
Argentina	58	70	56	70
Australia	21	23	19	17
Brazil	47	58	64	61
Canada	8	12	11	12
China	29	34	35	29
France	22	24	20	22
Germany	12	15	15	13
India	62	64	66	76
Indonesia	99	100	86	87
Italy	35	36	29	31
Japan	20	25	22	21
Mexico	81	79	63	66
Russian Federation	56	51	62	49
Saudi Arabia	54	48	42	38
South Africa	59	54	58	53
Republic of Korea	16	21	18	16
Turkey	65	74	68	54
United Kingdom	10	5	3	2
USA	7	10	5	6

Table 3. IER ranks of the B20 countries.

B20 countries	IER ranks			
	2011	2012	2013	2014
Argentina	8	51	20	43
Australia	97	107	116	81
Brazil	7	39	69	71
Canada	54	74	68	86
China	3	1	14	2
France	39	64	63	64
Germany	15	11	40	19
India	9	2	11	31
Indonesia	80	25	6	4
Italy	63	75	62	52
Japan	64	88	112	88
Mexico	90	101	56	79
Russian Federation	52	43	104	49
Saudi Arabia	98	127	61	70
South Africa	113	116	99	93
Republic of Korea	25	69	95	54
Turkey	28	40	29	11
United Kingdom	50	44	60	29
USA	26	70	86	57

Table 4. HC&R ranks of the B20 countries.

B20 countries	HC&R ranks			
	2011	2012	2013	2014
Argentina	63	58	51	41
Australia	9	24	11	7
Brazil	76	83	75	62
Canada	19	25	25	13
China	56	84	36	32
France	21	17	18	15
Germany	11	16	19	14
India	104	131	105	96
Indonesia	96	92	99	92
Italy	39	41	34	33
Japan	20	19	12	17
Mexico	73	81	66	56
Russian Federation	38	43	33	30
Saudi Arabia	53	40	39	47
South Africa	92	103	102	70
Republic of Korea	7	8	2	3
Turkey	80	82	76	54
United Kingdom	16	21	13	10
USA	13	22	6	11

Table 5. Income of the B20 countries.

B20 countries	Income			
	2011	2012	2013	2014
Argentina	UM	UM	UM	UM
Australia	HI	HI	HI	HI
Brazil	UM	UM	UM	UM
Canada	HI	HI	HI	HI
China	LM	UM	UM	UM
France	HI	HI	HI	HI
Germany	HI	HI	HI	HI
India	LM	LM	LM	LM
Indonesia	LM	LM	LM	LM
Italy	HI	HI	HI	HI
Japan	HI	HI	HI	HI
Mexico	UM	UM	UM	UM
Russian Federation	UM	UM	UM	HI
Saudi Arabia	HI	HI	HI	HI
South Africa	UM	UM	UM	UM
Republic of Korea	HI	HI	HI	HI
Turkey	UM	UM	UM	UM
United Kingdom	HI	HI	HI	HI
USA	HI	HI	HI	HI

Tables 2-5 show the GII, IER and HC&R ranks as well as the income classification of the B20 countries since 2011 excluding only the European Union economy (n/a). The G7 group includes Canada, France, Germany, Italy, Japan, the United Kingdom and the United States of America (USA). The BRICS group includes Brazil, the Russian Federation, India, China and South Africa.

All the G7 and BRICS countries are also members of the B20 coalition. The comparison of GII 2014 with GII 2011, GII 2012 and GII 2013 illustrates the stability at the top GII ranks and the gradual innovation improvement of most of the B20 countries. There is even a more noticeable tendency of an overall improvement of the GII, IER and HC&R ranks of the BRICS countries.

Table 6. GII ranks of the ASEAN countries.

ASEAN countries	GII ranks			
	2011	2012	2013	2014
Brunei Darussalam	75	53	74	88
Cambodia	111	129	110	106
Indonesia	99	100	85	87
Lao PDR	n/a	138	n/a	n/a
Malaysia	31	32	32	33
Myanmar	n/a	n/a	n/a	140
Philippines	91	95	90	100
Singapore	3	3	8	7
Thailand	48	57	57	48
Viet Nam	51	76	76	71

Table 7. IER ranks of the ASEAN countries.

ASEAN countries	IER ranks			
	2011	2012	2013	2014
Brunei Darussalam	101	104	119	139
Cambodia	87	128	39	67
Indonesia	80	25	6	4
Lao PDR	n/a	135	n/a	n/a
Malaysia	77	84	52	72
Myanmar	n/a	n/a	n/a	80
Philippines	62	32	24	35
Singapore	94	83	121	110
Thailand	56	61	76	62
Viet Nam	20	27	17	5

Table 8. HC&R ranks of the ASEAN countries.

ASEAN countries	HC&R ranks			
	2011	2012	2013	2014
Brunei Darussalam	77	66	65	95
Cambodia	121	134	131	127
Indonesia	96	92	99	92
Lao PDR	n/a	140	n/a	n/a
Malaysia	42	42	40	35
Myanmar	n/a	n/a	n/a	112
Philippines	116	121	116	121
Singapore	1	2	3	2
Thailand	87	101	46	36
Viet Nam	85	107	98	89

Table 9. Income of the ASEAN countries.

ASEAN countries	Income			
	2011	2012	2013	2014
Brunei Darussalam	HI	HI	HI	HI
Cambodia	LI	LI	LI	LI
Indonesia	LM	LM	LM	LM
Lao PDR	n/a	LM	n/a	n/a
Malaysia	UM	UM	UM	UM
Myanmar	n/a	n/a	n/a	LI
Philippines	LM	LM	LM	LM
Singapore	HI	HI	HI	HI
Thailand	LM	UM	UM	UM
Viet Nam	LM	LM	LM	LM

Tables 6-9 show the GII, IER and HC&R ranks as well as the income classification of the ASEAN countries since 2011. The income classification in Tables 5 and 9 includes high-income (HI) countries, upper-middle-income (UM) countries, lower-middle-income (LM) countries, and low-income (LI) countries in accordance with the World Bank Income Group Classification (2013). Positive changes from previous years in Tables 5 and 9 concerning the income status of China, the Russian Federation and Thailand are highlighted.

Considering the HC&R ranks of the B20 countries, the comparison of GII 2014 with GII 2013 shows than most countries have better ranks with the exception of Japan, Saudi Arabia, Republic of Korea, and the USA which apparently are high-income countries.

The G7 countries also have better HC&R ranks with the exception of Japan and the USA.

All the BRICS countries have better HC&R ranks as compared to the previous year. In particular, South Africa has the most noticeable change of its HC&R rank from 102 to 70.

Among the ASEAN countries, with the exception of Brunei Darussalam and the Philippines, the HC&R ranks of GII 2014 are better than the ones of GII 3013.

Most noticeable is the HC&R rank improvement of Thailand from 46 to 36. Thailand also has a substantial change of its GII rank from 57 to 48 and its IER rank from 76 to 62. This is an example that the HC&R rank of the second GII pillar can partially influence the average GII and the IER. Singapore, Malaysia and Thailand have the best HC&R ranks within ASEAN in GII 2014. In addition, Thailand (48^{th}) enters the list of the upper-middle income 10 best performers.

On a final note, the observed rank fluctuations in consecutive years may pose an open problem. Similarly to most publications containing numerical output, there is limited information about the precision of the raw data. The uncertainty during the calculation of the simple averages of the GII framework may account for suspected discrepancies rather than the actual dynamics of innovation indicators.

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