Kai L. Chan, PhD

INTELLIGENCE CAPITAL INDEX

Intelligence Capital Index (Jun 2016)
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The key qualities of a nation that will spur innovation and propel the knowledge economy are smarts and creativity. Underpinning these is the "intelligence capital" of a country, a measure of its knowledge capability, i.e. its stock of intellectual know-how along with its ability to develop and attract talent.

Modern economies rely on the ability to process large volumes of data and perform complex tasks. In a global knowledge economy, education and creativity are paramount to being competitive. The Intelligence Capital Index (ICI) is a way to measure the ability of countries to capitalise on the knowledge economy by assessing their environments for education, creativity and talent attraction.

Hitherto, most assessments of a country's knowledge base have been focused on the quantity of education and, when outputs are considered, it is invariably limited to average scholastic performance (in the form of standardised test results). But this view of quantity and of averages is misguided when considering the intelligence capital of a country.

What determines the knowledge capacity of a nation is not its average capability, but rather the talents of its brightest. The future software engineers, university professors, etc. of a country are not drawn from the pool of students who fall on the average of the spectrum, but rather by those excelling in their domains. That is, it is the Einsteins that expand the frontier of knowledge – although they do so within the framework of society (i.e. averages cannot be ignored, even if they are secondary).

Moreover, quantity measures of education are meaningless without adjusting for quality – a degree from Harvard or Princeton has a lot more gravity than from an unknown university in a developing country. And creativity should be part and parcel of any measure of human capital. Indeed, creativity is the key that unlocks the power of education.

Finally, little regard has traditionally been bestowed on the ability of nations to attract talent. Cities such as New York, London, Paris, Hong Kong and Singapore are magnets for bright and ambitious people. So even in the absence of a good domestic pipeline for talent, these cities (and thus their respective countries) are able to foster a climate that promotes intellectualism and innovation.

METHODOLOGY

The ICI considers five aspects of knowledge acquisition/production: (1) Quantity of education; (2) Quality of education; (3) Average educational skills; (4) Elite educational skills; (5) Creativity and complexity; and (5) Attractiveness and openness to talent. Underlying these aspects are a set of indicators (see below) that characterise each of these channels of knowledge acquisition/production.

Table 1: Intelligence Capital Index methodology

#	QUANTITY (10%)	QUALITY (20%)	AVG SKILLS (10%)	ELITE SKILLS (20%)	CREATIVITY (20%)	ATTRACT (20%)
1	Primary ER*	Top 500 uni	Avg TIMMS (Gr4)*	95th TIMMS (Gr4)*	Creativity index	Migrant (%)*
2	Secondary ER*	Nobel+Fields prizes	Avg PISA (15yo)*	95th PISA (15yo)*	Complexity index	Skilled labour (%)
3	Tertiary ER	Nobel+Fields/cap*	Avg GMAT score	700+ GMAT score	R&D as % of GDP	GFCI score
4	Yrs of schooling		Avg PIAAC (adult)	Top PIAAC (adult)		QOL index
5	School LE					
6	GMAT takers/cap*					

Weights are inversely proportional to the number of indicators in the aspect. Indicators with an asterisk (*) have 1/2 weight within aspect.

In total, there are 24 indicators in the ICI and span the lifecycle of talent from childhood through the marketplace. The index is additive and all indicator values are transformed into unit-free scores in the range [0,100]. Thus the index score itself – a weighted average of the transformed scores – also falls in the range [0,100]. Full details on the indicators and methodology can be found here.

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RESULTS (TOP 15)

Which county has the best intellectual ecosystem? The United States comes out on top with a clear lead over the rest of the field. Its dominant position is a result of its exceptional performance on the quality (of education) aspect. It is home to a majority of the world's leading institutions of higher learning and has earned an outsized number of Nobel Prizes and Fields Medals. Its status as a magnet for talent is also reflected in its high creativity (3) and attract (7) aspect rankings – indeed, Silicon Valley, Wall Street and Cambridge are the world's leading centres for IT/entrepreneurship, finance and research/higher education, respectively. However, the country lags in its average skills (35) and elite skills (23) aspects.

The top-15 ICI countries include 10 from Europe, 2 from (East) Asia and 6 from the English-speaking world. The prevalence of English amongst the top ICI countries should come as no surprise as the English language, *per se*, is a competitive advantage for nations. (See the Power Language Index here.) English is the global *lingua franca* and the international language of business and knowledge.

Number 2 on the list is the UK, powered by its strong performance in its quality (2) and elite skills (3) aspects. Germany (3) is the leading non-English-speaking nation. It is also a powerhouse in (educational) quality (3), trailing just the USA and UK as a centre for academic excellence. Australia places 4th and is the global leader in the elite skills aspect. Singapore places an impressive 5th in the ICI in spite of its small size – size is an advantage in the quality aspect as it counts the number of top-ranked universities (quality adjusted) domiciled there. Here Singapore boasts two global universities (NUS and NTU).

Rounding out the top 10 are Sweden, Switzerland, Canada, Finland and Denmark. Japan (11) just misses inclusion in the top-10 due to its weak standing in attracting talent (28). If not for the attract aspect, it would place 5th in the ICI. Sweden is notable for having a big gap between average and elite performance (23 positions), driven most likely by the demographics of recent immigration.

These results are a snapshot in time. Countries such as China (30) and Korea (17) are aggressively targeting their knowledge sectors, while some European countries will have a daunting task of integrating large numbers of unskilled migrants. The results herein also show that the quantity of education is not a primary factor in intelligence capital – although the top country has a high quantity aspect rank, it is not true for most other top performers. (Too much education can also be sub-optimal!)

Table 2: Intelligence Capital Index results (top-15 countries)

TOP-10 ICI COUNTRIES			INTELLECTUAL CAPITAL ASPECT RANKS					
RANK	COUNTRY	SCORE	QUANTITY	QUALITY	AVG SKILLS	ELITE SKILLS	CREATIVITY	ATTRACT
1	USA	74.883	1	1	35	23	3	7
2	UK	64.192	22	2	7	3	16	11
3	Germany	64.179	19	3	12	10	7	9
4	Australia	63.960	2	15	6	1	17	4
5	Singapore	63.599	15	52	2	2	12	2
6	Sweden	61.582	21	6	36	13	1	10
7	Switzerland	61.574	27	5	22	19	6	3
8	Canada	61.149	12	7	19	5	18	5
9	Finland	60.445	14	23	15	9	2	19
10	Denmark	60.252	5	9	21	14	9	12
11	Japan	58.911	33	13	3	6	5	28
12	Netherlands	58.744	9	11	14	16	15	8
13	Belgium	58.733	24	18	5	4	20	17
14	Austria	58.657	31	8	9	12	10	13
15	New Zealand	57.334	4	27	11	7	22	14

Only countries with at least 15 (out of a total 24) valid indicators are ranked in the ICI. Missing indicators are estimated using a two-stage process that assigns the minimum value for similar (income and geography) country groups that have valid data. Full results (128 economies are assessed) and details on the indicators and methodology can be found here.

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