

A presentation to the UAE Economics Network at the Canadian embassy (Abu Dhabi, UAE)

Kai L. Chan, PhD
Kai.Chan@INSEAD.edu
www.KaiLChan.ca



CONTENT

- ▶ ■ What is a global performance index?
 - UAE government & policy
 - Pros and cons of reports-based policy making
 - How to interpret and use reports to guide policy
 - Appendix

Global performance indices...

Take data inputs (indicators) to produce a rankable output (index)



A global performance index (a.k.a. "competitiveness report" in the UAE) provides a measure of a country's strength in a given sector/dimension relative to other nation states. They allow the UAE to benchmark its performance against other countries and a deterministic path on how to improve on the measure.



"If you can't measure it, it doesn't exist."
Bill Gates



In recent years a proliferation of such indices

However, a small subset are globally recognised (albeit flawed)



WORLD
ECONOMIC
FORUM



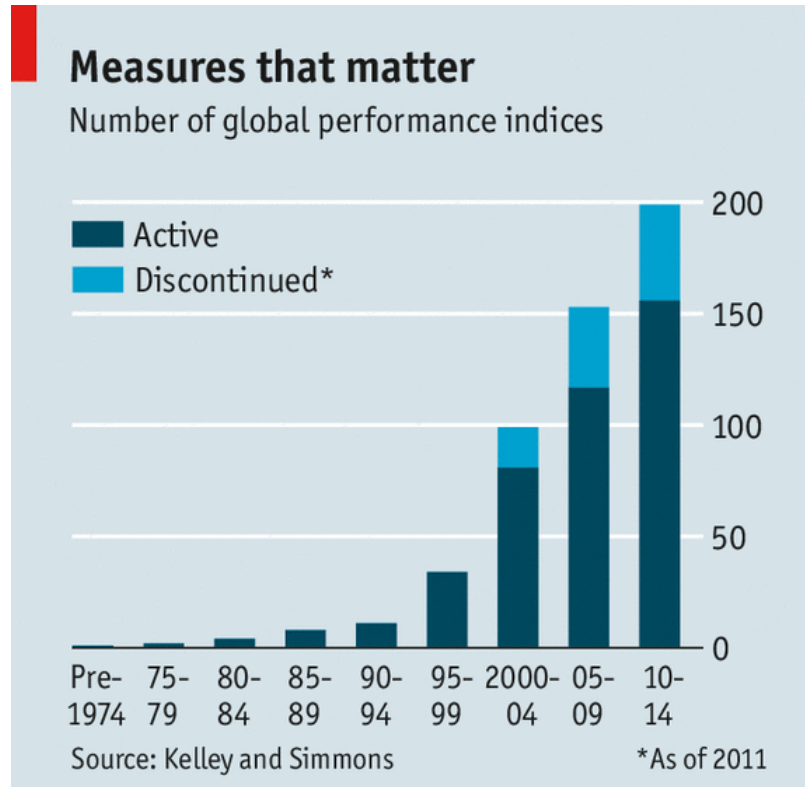
THE WORLD BANK



TRANSPARENCY
INTERNATIONAL



LEGATUM
INSTITUTE



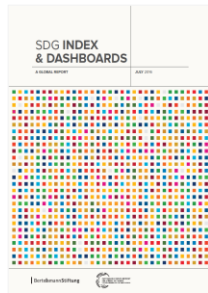
INSEAD

The Business School
for the World®

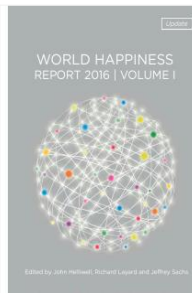


Selection of reports actively monitored by UAE

Both the index and its components are tracked by FCSEA/PMO



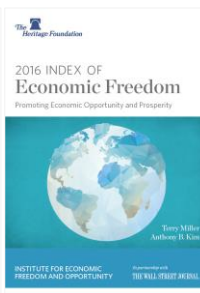
BS-SDGI



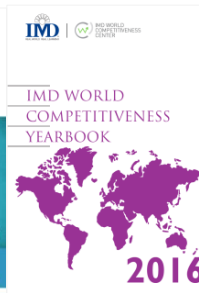
EI-WHR



GEDI-GEI



HF-IEF



IMD-WCY



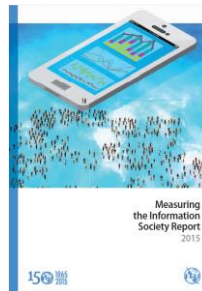
IMD-WTR



INSEAD-GII



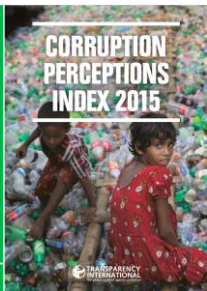
INSEAD-TCI



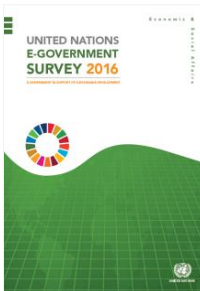
ITU-IDI



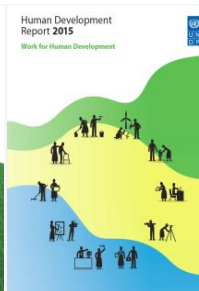
LI-LPI



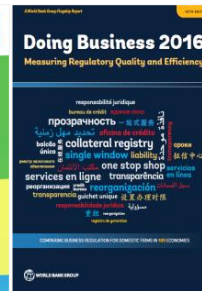
TI-CPI



UN-eGovt



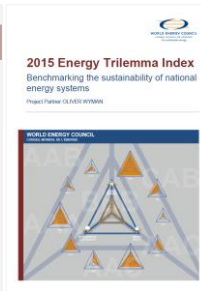
UN-HDR



WB-DBR



WB-LPI



WEC-ETI



WEF-ETR



WEF-GCR



WEF-GGR



WEF-HCR



WEF-ITR



WEF-TTR



Yale-EPI



ZY-FCI

WEF Global Competitiveness Report (GCR)

Index score is akin to a GPA based on the various “subjects” of the report



Competitiveness pertains to the ability & performance of a firm, sub-sector or country to sell and supply goods & services in a given market, in relation to the ability & performance of other firms, subsectors or countries in the same mkt.

Institutions

Infrastructure

Macroeconomic environment

Health & primary education

Higher education & training

Goods market efficiency

Labour market efficiency

Financial market development

Technological readiness

Market size

Business sophistication

Innovation



Multi-stage process to generate index score

Clean data; normalize it (unit-free); aggregate it into a rankable output



$f(x)$

Clean

Normalise

Aggregate

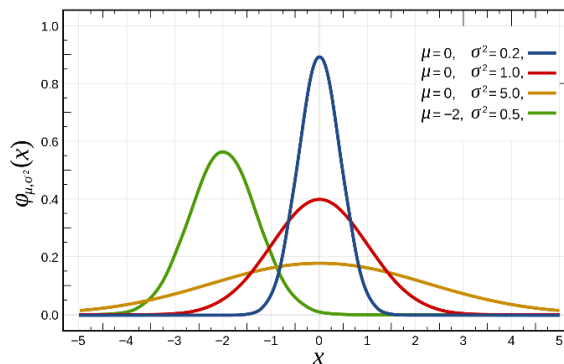
0

1

2

$$\text{Value} \equiv v \rightarrow c(v) = x \rightarrow \text{Score}(x) \rightarrow \text{Index}(s(x)) \in \mathbb{R}$$

$$\textcircled{0} \quad c(v) = \begin{cases} \bar{v} : v > \bar{V} \\ v : \underline{V} \leq v \leq \bar{V} \\ \underline{v} : v < \underline{V} \end{cases}$$



$$I(s(x)) = \sum_{i=1}^N \alpha_i s_i(x)$$

2

$$I(s(x)) = \left(\prod_{i=1}^N \alpha_i s_i(x) \right)^{1/N}$$

$$\textcircled{1} \quad s(x) = \begin{cases} \frac{x - \mu}{\sigma} : x \in G \\ -\frac{x - \mu}{\sigma} : x \in B \\ \alpha \log(x) + \beta : x \notin N \end{cases} \quad s(x) = \begin{cases} 6 \left(\frac{x - \min}{\max - \min} \right) + 1 : x \in G \\ -6 \left(\frac{x - \min}{\max - \min} \right) + 7 : x \in B \\ \alpha \log(x) + \beta : x \notin N \end{cases}$$



CONTENT

- What is a global performance index?
- ▶ ■ UAE government & policy
 - Pros and cons of reports-based policy making
 - How to interpret and use reports to guide policy
 - Appendix

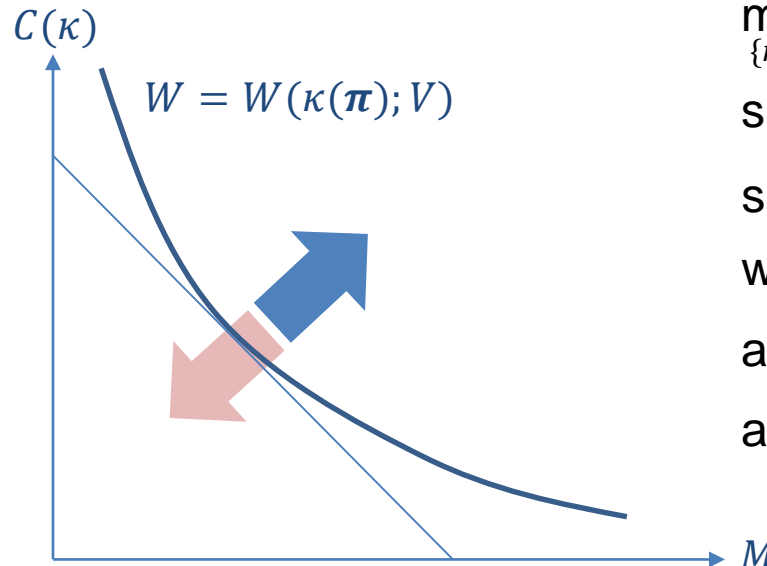
Government policy as a maximisation problem

Maximise social welfare choosing policy variables that achieve KPIs



The UAE government places great priority (and its legitimacy of rule) on delivering a high quality of life to its citizens. The UAE government accomplishes this through three primary means:

1. *Placing key performance indicators on government bodies to ensure transparent policymaking that works to improve the country*
2. Attracting expats to the country to help make the country prosperous
3. Creating conditions favourable to its citizens and offering them employment through the public and semi-public sectors



$$\begin{aligned}
 \max_{\{\kappa; \pi\}} \mathbf{W} &= \sum_{i=1}^N \omega_i W_i(\kappa; \mathbf{V}) \\
 \text{s. t. } \mathbf{V} &= \sum_{j=1}^M \vartheta_j V_j \geq \bar{V} \text{ and } M = \min\{\mathbf{M}\} \\
 \text{s. t. } C(\kappa(\pi)) &\leq B \text{ and } \kappa_{t|0} \rightarrow \kappa_{t|T} \\
 &\text{where } W'_i(\kappa; \cdot) \geq 0 \text{ and } W'_i(\cdot; \mathbf{V}) \geq 0 \\
 &\text{and } g(\kappa; \cdot) \geq 0; \text{ and } \kappa \text{ a set of KPIs} \\
 \text{and } \kappa &= \kappa(\underbrace{\pi_1, \pi_2, \pi_3, \dots, \pi_L}_{\text{Policy variables}}) = \kappa(\pi)
 \end{aligned}$$

Government policy is set top down

PMO announces general direction mapped to quantifiable 3rd-party KPIs



The PMO sets policy by mandating government departments to enact policies that will be reflected in international reports (e.g. WEF-GCR)



UNITED ARAB EMIRATES
PRIME MINISTER OFFICE



Emirates
Competitiveness
Council



United Arab Emirates



United Arab Emirates



United Arab Emirates

{POLICIES}



Dedicated gov't unit
to drive/manage
KPI-driven policies

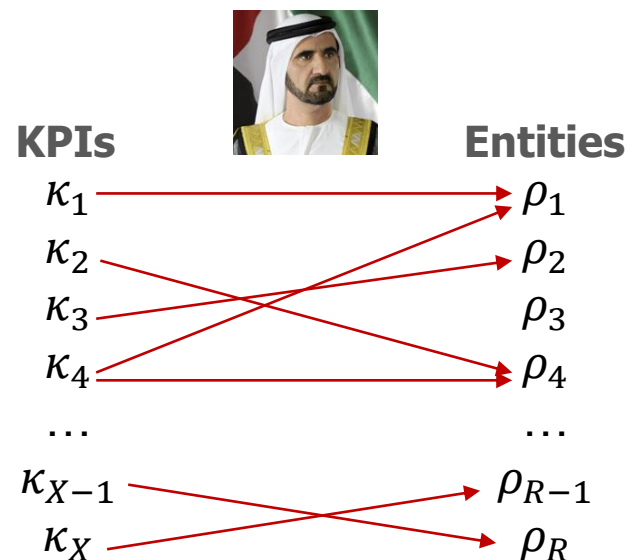


KPIs assigned to all government entities

They incentive entities to enact policies aligned with development goals



The PMO assigns KPIs (indicators, indices, etc.) to every Ministry/Minister based on 3rd-party metrics – encouragement also in place for the private sector. Quantifiable targets give entities clarity on how to set policies and incentivise parties to enact legislation aligned with the UAE's strategic development goals.



Vision 2021: "National Agenda" goals

The UAE has laid out a clear strategic roadmap for development



But how to measure success of these goals?...

10 of the National Agenda goals tied to indices

Many other goals are tied to indicators within global indices



13 / 160

10



16 / 140

10



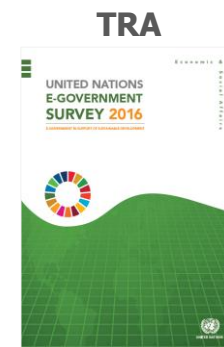
19 / 132

10



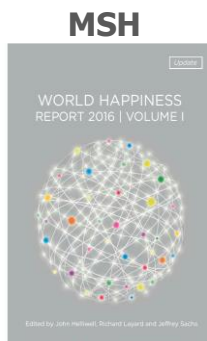
26 / 143

10



26 / 139

10



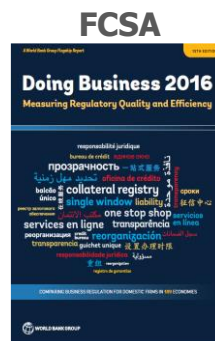
28 / 157

5



34 / 142

20



31 / 189

1



41 / 128

10



41 / 185

10

The UAE's diversification goals are tied to indices

Targeted sectors of economy are mapped to global performance reports



Photo: Masdar stock.



CONTENT

- What is a global performance index?
- UAE government & policy
- ▶ ■ Pros and cons of reports-based policy making
- How to interpret and use reports to guide policy
- Appendix

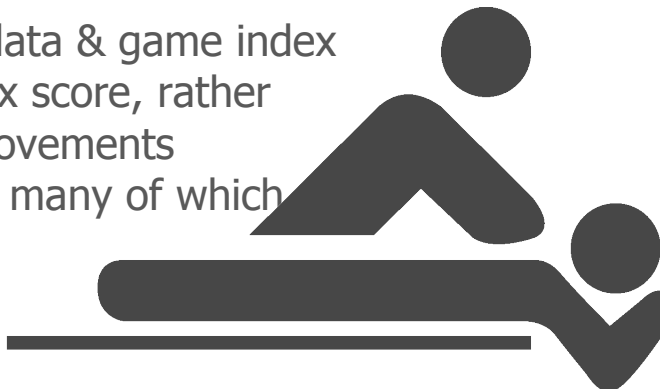
Negatives of using performance indices

Chasing rank may lead to gaming the index and flaws of the report



Global performance indices are, by nature, designed to look at the international landscape and not to the specifics of a country or region.

- Incentive to massage data & game index
- Overly focused on index score, rather than actual policy improvements
- Proliferation of indices, many of which are poorly constructed (including some with global cache)



- Misleading inputs
- Misleading outputs (e.g. IMD-WCY score)
- Subject to non-robust methodologies

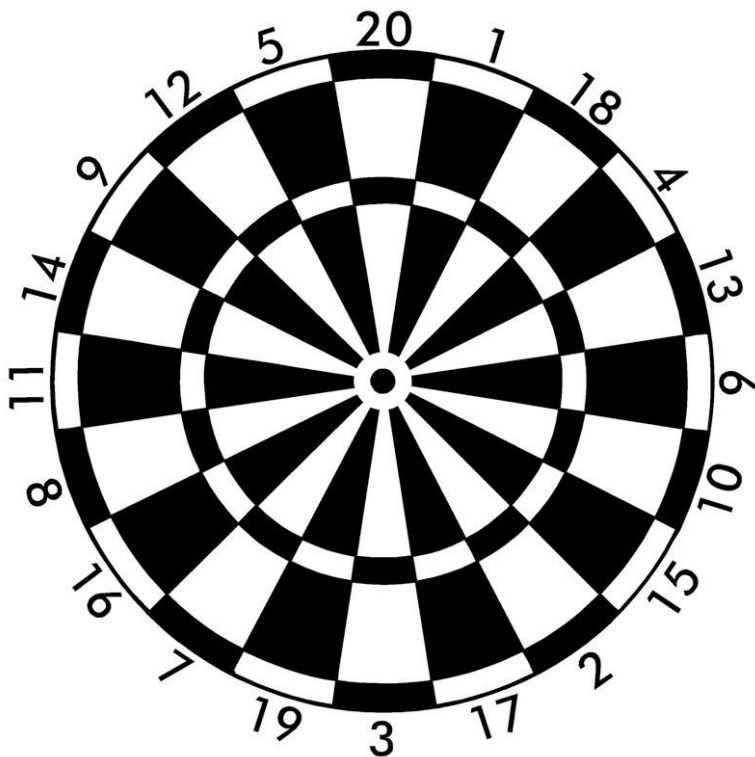


Measurement error and moving targets

Subject to whims of methodologies of indices

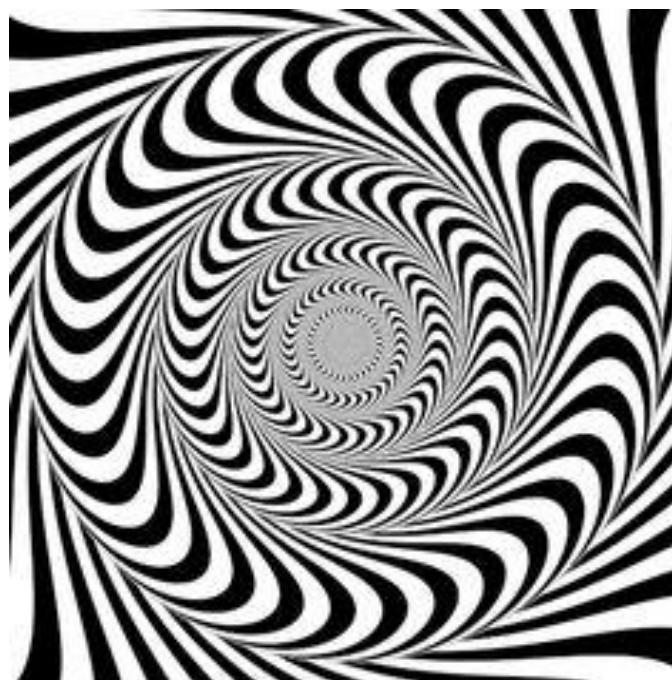


Index relies on data inputs, but data are measured with error (especially in the UAE)...



So index result is often misleading. Moreover, survey data are not calibrated and of small sample size

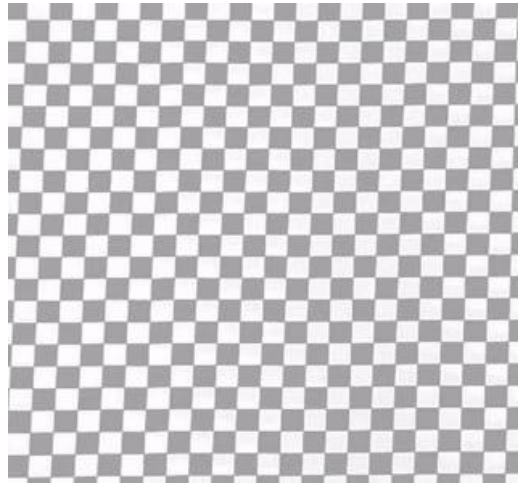
The index inputs and methodology are subject to change from year to year...



So policies that are set based on a given index construction need to be reset frequently

Positives of using performance indices

Simplicity, transparency and third-party recognition



"Be number one!"



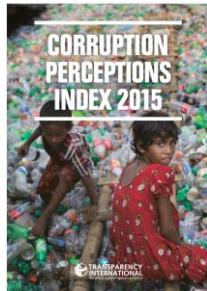
"Be number one!"



United Arab Emirates



Good performance/recognition of UAE/Dubai helped win right to Expo 2020



WORLD ECONOMIC FORUM
ANNUAL MEETING
DAVOS 2018
JANUARY 29 - FEBRUARY 3, 2018

English Report

The Global Competitiveness Report 2016–2017

Oliver Schmidt, World Economic Forum

[illegible]

WB-DBR



CONTENT

- What is a global performance index?
- UAE government & policy
- Pros and cons of reports-based policy making
- ▶ ■ How to interpret and use reports to guide policy
- Appendix

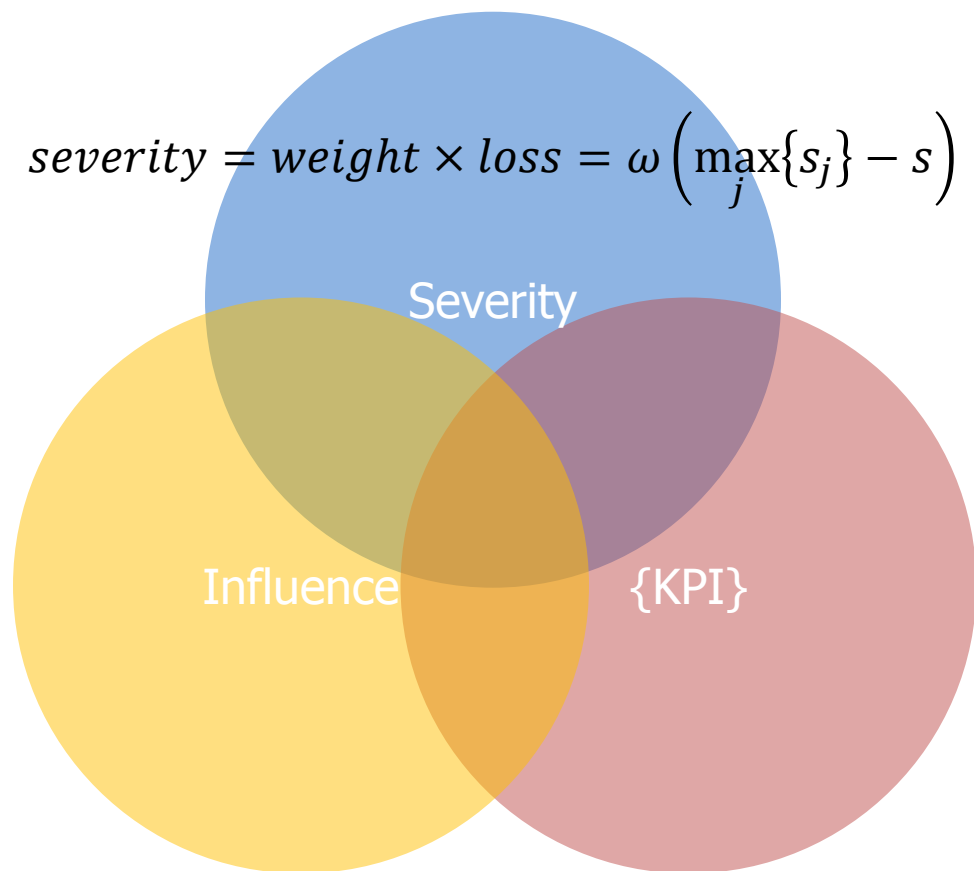
Prioritising indices and indicators

Which reports are relevant? Which indicators are key to improving on index?



CRITERIA	STATUS
Topic	National Agenda; PMO KPIs
UAE coverage	✓
Frequency	Regular
Reputation	Global and credible
Usefulness / Actionable	✓
Objectivity	✓
Transparency	✓

Once reports are chosen, priority is placed on working on indicators that will improve most the rank (the sensitivity of the index to a change in an indicator)



Understanding the reports

It is not sufficient to just consider indicator values and/or ranks



Indicator	Grouping	Unit	+/-	Data type	Score	Rank	Weight	Source
Property rights	Institutions	[1, 7]-discrete	+	Survey	5.5	23	0.53%	WEF EOS
Inflation	Macro-economy	%	-	Data	1.1	1	1.06%	IMF WEO
GDP	Market size	\$BN (PPP)	+	Data	272.0	49	6.25%	IMF WEO
Days to start a business	Goods mkt efficiency	Day	+	Data	8.0	39	0.35%	World Bank
Malaria cases	Health & education	Per 100,000	-	Data	MF	n/a	0.33%	WHO
GCI score	Index	[1, 7]-continuous	+	Index	5.33	12	100.0%	WEF

What improves the index score (and rank) more:

- (1) An increase in property rights by 0.5? or
- (2) An increase in GDP of 14? or
- (3) Reducing days to start a business by 1?

Cannot answer this question by looking at ranks or scores!

Fallacy of looking at values and ranks

Indices are constructed to compare indicator values against other countries



Net enrolment ratio	Score (2014)	Rank (2014)
Country #1	100.0	1
Country #2	100.0	1
Country #3	100.0	1
Country #4	100.0	1
Country #5	100.0	1
...	...	
Country #99	100.0	1
UAE	100.0	1
Country #101	99.0	101
...	...	

Net enrolment ratio	Score (2014)	Rank (2014)
Country #1	100.0	1
Country #2	100.0	1
Country #3	100.0	1
Country #4	100.0	1
Country #5	100.0	1
...	...	
Country #99	100.0	1
UAE	100.0	1
Country #101	99.0	101
...	...	

~~"Enrolment ratio rank dropped from 1 to 100 leading to a sharp fall in our rank."~~

~~"GDP growth fell by half so it lowered our score and rank."~~

GDP growth (%)	Score (2014)	Rank (2014)
Country #1	10.0	1
Country #2	9.9	2
Country #3	9.8	3
Country #4	9.7	4
Country #5	9.6	5
...	...	
Country #99	0.2	99
UAE	0.1	100
Country #101	0.0	101
...	...	

GDP growth (%)	Score (2014)	Rank (2014)
Country #1	5.0	1
Country #2	4.9	2
Country #3	4.8	3
Country #4	4.7	4
Country #5	4.6	5
...	...	
Country #99	-4.8	99
UAE	-4.9	100
Country #101	-5.0	101
...	...	

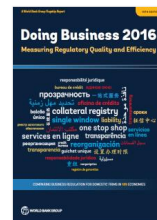
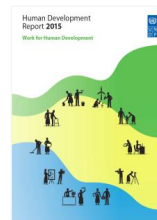
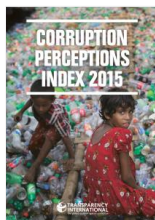
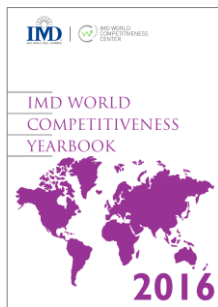
Indicator score rather than value is important

Score is the unit-free normalised value indicator value



Z-score example (e.g. IMD-WCY)

Indicator	Units	Value (2015)	Value (2014)	Change	Avg (2015)	Stdev (2015)	Avg (2014)	Stdev (2014)	Score (2015)	Score (2014)	Change
Property rights	Survey	5.5	5.0	+0.5	5.5	1.2	5.0	1.1	0	0	N/C —
GDP growth rate	%	3.2	4.1	-0.9	2.5	2.9	3.9	3.0	0.241	0.067	+0.175
Years of schooling	Years	9.9	9.9	N/C —	10.1	4.0	9.8	4.0	-0.050	0.025	-0.075
Days to start bus.	Days	8	9	+1	9	5	11	6	-0.200	0.333	-0.133
PISA score	[200, 800]	450	460	-10	490	105	510	110	-0.381	-0.455	+0.074
INDEX (RANK)	ℝ	15	10	-5							



7-score example (e.g. WEF-GCR)

Indicator	Units	Value (2015)	Value (2014)	Change	Min (2015)	Max (2015)	Min (2014)	Max (2014)	Score (2015)	Score (2014)	Change
Property rights	Survey	5.0	5.5	-0.5	3.5	6.8	3.3	6.9	5.0	5.5	-0.5
GDP growth rate	%	4.1	3.2	-0.9	2.0	16.0	-4.0	10.0	1.90	4.09	-2.19
Years of schooling	Years	9.9	9.9	N/C —	5.0	18.0	6.0	16.0	3.26	3.34	-0.08
Days to start bus.	Days	9	8	+1	4	22	4	16	5.33	5.00	+0.33
PISA score	[200, 800]	460	450	-10	410	600	320	560	2.58	4.25	-1.67
INDEX (RANK)	ℝ	10	15	-5							

No such thing as missing indicators

Mistaken belief about the impact of “missing data”



$$f^{-1}(x)$$

When an indicator is missing, the weight of that variable is reassigned to the other indicators within the indicator group. However, if a country is missing too many values its inclusion in the index/report may be dropped.

“The missing data are hurting the UAE.”

“The lack of data is holding back the UAE’s performance on the index.”

“We will improve on the report if we can find all the data.”

Example of how missing data are treated

Missing values do not (ex ante) hurt a country's performance



The vast majority of reports “do not consider/ignore” missing data and shift weight of indicator to remaining indicators within the group...

Indicator	Data type	Weight	Value	UAE weight	Score	Implicit value
Indicator #1.1	Survey	1.0%	5.0	1.67%	5.0	
Indicator #1.2	Survey	1.0%	5.5	1.67%	5.5	
Indicator #1.3	Survey	1.0%	6.0	1.67%	6.0	
Indicator #1.4	Data	2.0%	N/A	0.00%	Avg	5.5
Indicator #2.1	Data	2.0%	42,000	2.40%	6.1	
Indicator #2.2	Data	2.0%	6.2	2.40%	6.2	
Indicator #2.3	Survey	1.0%	76.7	1.20%	6.3	
Indicator #2.4	Data	1.0%	N/A	0.00%	W-Avg	$f^{-1}(6.18)$
Indicator #3.1	Data	1.0%	6.6			
...						

But this is misleading/wrong! Any treatment of missing data assigns it a value!

Targeting indices is an indirect growth strategy

But it is akin to central banks targeting inflation rate



Policy reform;
data/index message

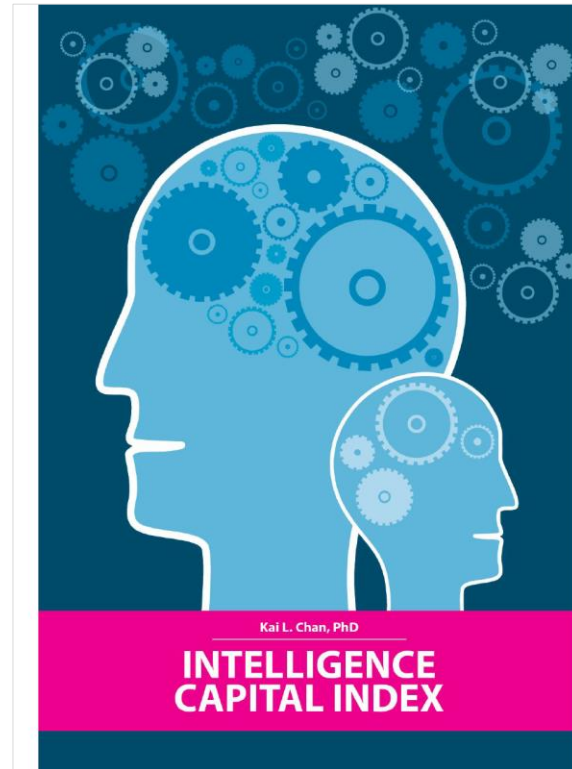
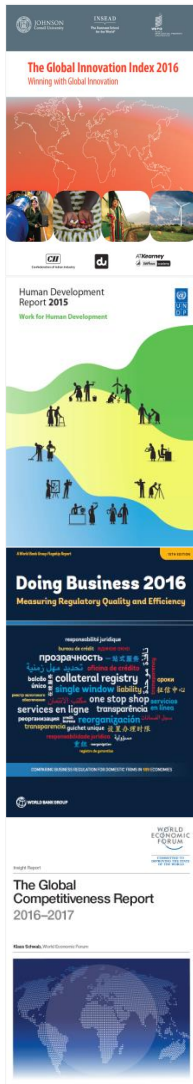
Index indicator / KPI

Creating policies (or massaging data/index) for the purpose of achieving a KPI is a second-best way of achieving development goals, but its transparency and ability to rally support amongst the population make it an effective means of policy making in the UAE.

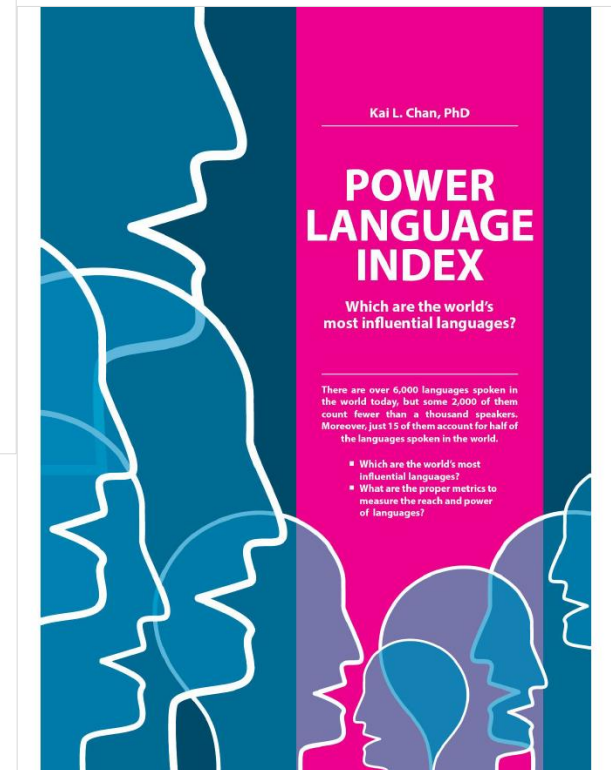
Development goal

Do not need to rely always on third parties

Use public data and apply index methodologies to create custom indices



Pick and choose the knowledge and intellectual capital of the reports and use it to create tailored index that will be more applicable to the UAE (or desired target)



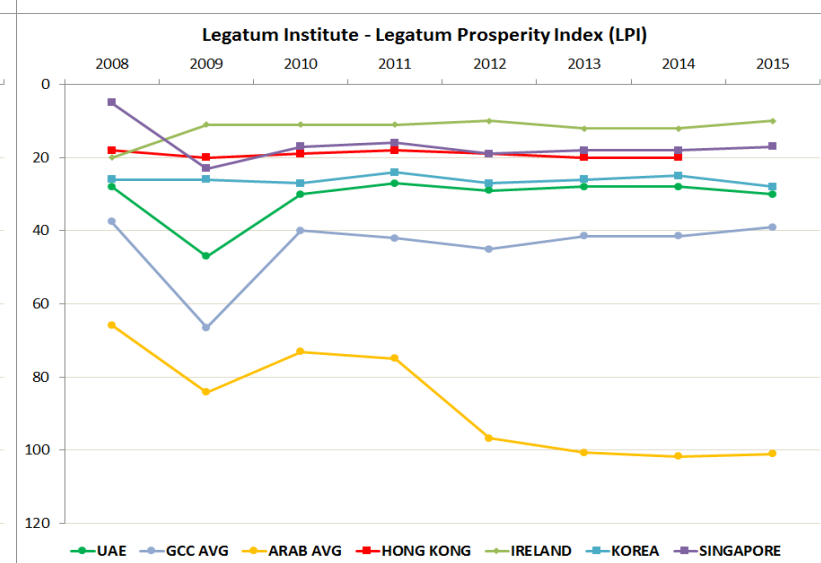
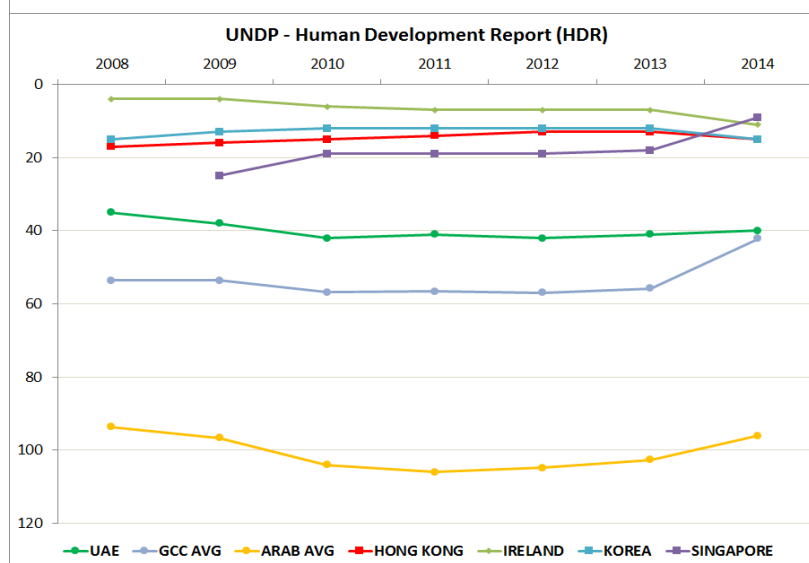
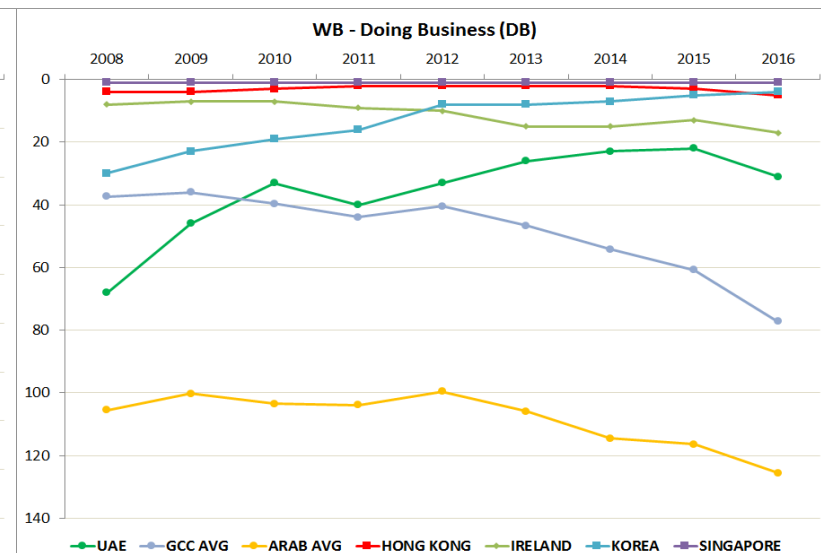
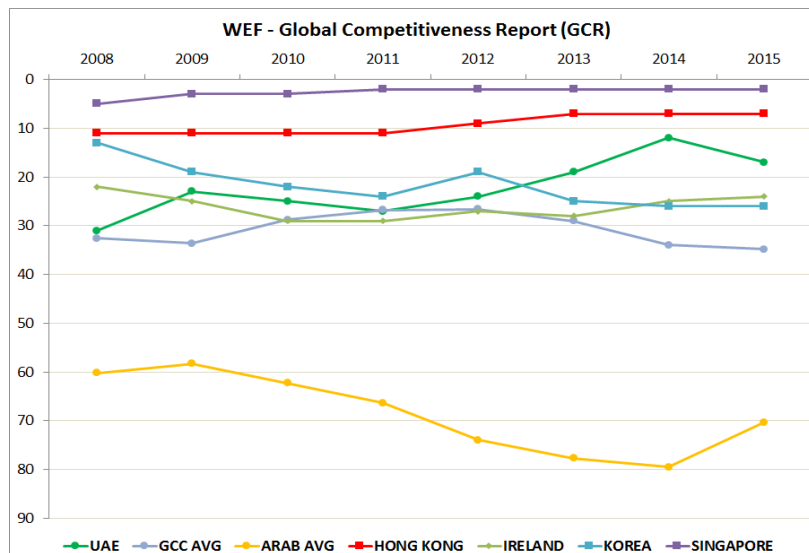


CONTENT

- What is a global performance index?
- UAE government & policy
- Pros and cons of reports-based policy making
- How to interpret and use reports to guide policy
- ▶ ■ Appendix

APPENDIX: Historical performance of the UAE

WEF-GCR, WB-DBR, UNDP-HDR, LI-LPI



Sources: Legatum Institute, UNDP-HDR, WEF-GCR, World Bank DBR.