TECHNICAL REPORT

The Structure of the Index

Telefónica Index on Digital Life is designed as a composite index.

The index combines data at five levels of aggregation (see Figure 1): (1) Key Performance Indicators (KPIs); (2) Variables; (3) Pillars; (4) Sub-indices; and (5) TIDL index. Moving from the bottom level to the top, we aggregate 53 KPIs and consolidate them to 37 variables. These variables are then grouped into 8 pillars. From the eight pillars, three sub-indices are formed. The final TIDL index is then composed of three sub-indices.
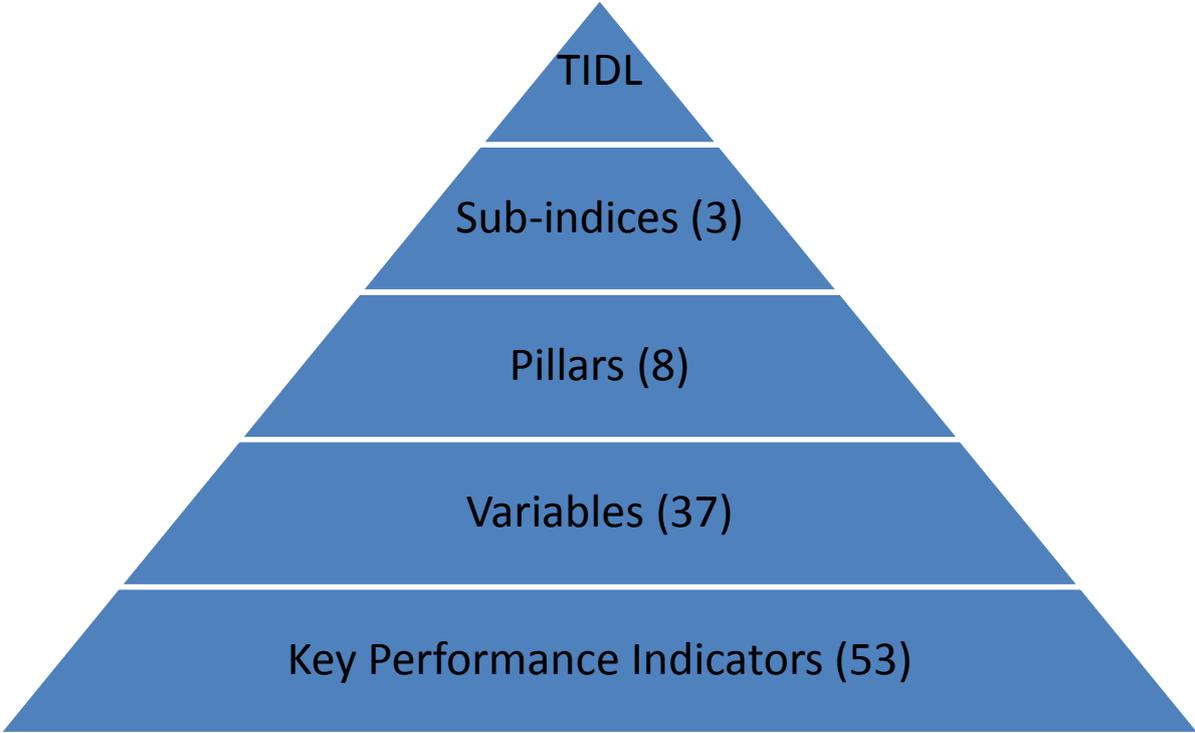

Figure 1   Five layers of the TIDL index

Calculation of the TIDL scores

A ten-step process was used to calculate the TIDL scores:

1 When necessary, KPI scales were first re-coded such that higher values indicated greater properties. The distributions were then capped to eliminate bias caused by abnormally high values. Capping was set at 90%. The highest values in each distribution were then set as benchmark values.

2 The four entrepreneurship KPIs were calculated by combining entrepreneurial abilities (opportunity motivations, education) and aspirations (innovation, informal investment) with data describing general entrepreneurial attitudes. Entrepreneurial attitudes were calculated as the average of the young (18-35 years old) generation's recognition of entrepreneurial opportunities, perception of startup skills, familiarity ties with entrepreneurs, risk acceptance, and perceptions of entrepreneurial culture. The four entrepreneurial KPIs were then constructed as in Table 1.

Table 1   Calculation of Entrepreneurship KPIs

Sub-index	Entrepreneurial abilities and aspirations		Entrepreneurial attitude variables		Entrepreneurship KPIs
Digital Entrepreneurship	Education level of nascent and new entrepreneurs	x	Attitudes	=	Education * Attitudes
	Share of opportunity-driven nascent and new entrepreneurs of total	x	Attitudes	=	Opportunity * Attitudes
	Share of innovating nascent and new entrepreneurs of total	x	Attitudes	=	Innovation * Attitudes
	Informal investor activity	x	Attitudes	=	Informal Investors * Attitudes

3 After reversing and capping, all 53 KPIs were normalised within the range of [0 … 1], see Equation 1.

$$KPIn_{i,p} = \frac{KPI_{i,p}}{\max KPI_{i,p}} \qquad \text{(Equation 1)}$$

for all p= 1 … 53, the number of KPIs and

for all i= 1 … 34, the number of countries

where $KPIn_{i,j}$ is the normalised score value for country i and KPI j
$KPI_{i,p}$ is the original KPI value for country i and KPI p
$\max KPI_{i,p}$ is the maximum value for KPI p

This distance method guarantees that the best performing country(ies) among the 34 always received the maximum score of 1. The worst performing country's score depends on its relative position to the best country but is not necessary zero. A country received zero points only if it had zero performance for a given scale.

4   After normalisation, we calculated the 37 variable values from the 53 KPIs. Then, we calculated the variables as the average of the normalised KPIs using Equation 2:

$$VAR_{i,m} = \frac{\sum_{l=1}^{n} KPI_{i,p}}{n} \qquad \text{(Equation 2)}$$

where $VAR_{i,m}$ is the "m"th variable of country i
m: the number of variables, m= 1….37
for all i= 1 … 34, the number of countries
l is the number of KPIs in the "m"th variable
l=1…n

3   After calculating the variable values, we normalised again using Equation 3:

$$VARn_{i,m} = \frac{VAR_{i,m}}{\max VAR_{i,m}} \qquad \text{(Equation 3)}$$

where $VARn_{i,m}$ is the normalised value of "m"th variable of country i
$\max VARn_{i,m}$ is the maximum value of "m"th variable

4   After normalisation, we calculated the eight pillar values from the 37 variables. Equation 4 describes the calculation:

$$z_{i,j} = \frac{\sum_{s=1}^{t} VARn_{i,m}}{t} \qquad \text{(Equation 4)}$$

where $z_{i,j}$ is the pillar value for country i and pillar j
j=1….8, the number of pillars
s=1..37, the number of variables
t=1…t, the number of variables in pillar j

5   In order to obtain the same benchmarks, we re-scaled the values of the final pillars to the range from 0 to 1:

$$x_{i,j} = \frac{z_{i,j}}{\max z_{i,j}} \qquad \text{(Equation 5)}$$

for all j= 1 … 8, the number of pillars
where $x_{i,j}$ is the re-scaled score value for country i and pillar j
$z_{i,j}$ is the final pillar value for country i and pillar j

$\max z_{i,j}$ is the maximum value for pillar j

6 The next step was to eliminate any potential distortion resulting from imbalance across index pillars. We transformed the pillar values so as to equalise the average values of all pillars. Equation 6 shows the calculation of the average value of pillar j.

$$\tilde{x}_j = \frac{\sum_{i=1}^{n} x_{i,j}}{n}$$
(Equation 6)

$x_{i,j}$ values are transformed to show that the minimum value is 0 and the maximum value is 1:

$$y_{i,j} = x_{i,j}^{k}$$
(Equation 7)

where k is the "strength of adjustment", the k-th moment of x_j is exactly the needed average, $\overline{y}_j$. We then find the root using the following equation for k:

$$\sum_{i=1}^{n} x_{i,j}^{k} - n\overline{y}_j = 0$$
(Equation 8)

The function is decreasing and convex, which means it can be solved using the Newton-Raphson method with an initial guess of 0. Note that if:

$$\overline{x}_j < \overline{y}_j \quad k < 1$$
$$\overline{x}_j = \overline{y}_j \quad k = 1$$
$$\overline{x}_j > \overline{y}_j \quad k > 1$$

that is k be thought of as the strength (and direction) of adjustment.

7 The three sub-indices were then calculated as the average of the pillars belonging to a given sub-index and multiplied by 100 to get a 0-100 point scale (Equation 9).

$$OPP_i = \frac{100 * \sum_{j=1}^{2} y_{i,j}}{2}$$
(Equation 9a)

$$CON_i = \frac{100 * \sum_{j=3}^{4} y_{i,j}}{2}$$
(Equation 9b)

$$ENT_i = \frac{100 * \sum_{j=5}^{8} y_{i,j}}{4}$$
(Equation 9c)

where OPP= Digital Openness
CON= Digital Confidence
ENT = Digital Entrepreneurship

8   Finally, the TIDL index is calculated as the average of the three sub-indices:

$$TIDL_i = \frac{1}{3}(OPP_i + CON_i + ENT_i) \qquad \text{(Equation 10)}$$

Missing data issue

Our dataset consists of 34 countries and 83 KPIs. In our case, as in many other cases, not all the data are available for all countries. To assess potential bias caused by missing data, we developed an estimate as a simplified form of the Mudgett (1951) index. Technically, this is based on the percentage of 'missing' values in the data. The Mudgett index is calculated as in Equation 11:

$$MUD = \frac{n - m_j}{n + m} \qquad \text{(Equation 11)}$$

where   MUD= Mudgett score
n= 53, the number of KPIs
m_j= the number of KPIs of country j

The MUD is 0 if a given country has no missing data. The highest theoretical value of MUD would be 1 when all the data are missing for a given country. As a rule of thumb, if the MUD score is over 0.5 for any given country, meaning that half of its KPI data are missing, then the country should be removed from the dataset. Here we developed an interpretation of the Mudgett scores based on the traditional statistical tests, as:

below 0.001 = excellent;
below 0.05 = good;
below 0.10 = acceptable; and
over 0.10 = caution!

Seven countries had no missing data (MUD=0). Another 20 countries exhibited a MUD score lower than 0.05. Another six countries exhibited a MUD score below 0.10. Only one country, Nicaragua, had a MUD score above 0.10, at MUD = 0.107. As this was only slightly over the acceptable score, we retained Nicaragua in the dataset.

Overall, the number of missing data in the TIDL dataset is fully comparable to other widely used datasets (e.g., World Economic Forum, World Bank), and the risk of distortion due to missing data is small.

Table 2   Mudgett scores for the 34 countries

COUNTRY	MUDGETT SCORE	EVALUATION
Argentina	0.031	good
Australia	0.000	excellent
Brazil	0.000	excellent
Canada	0.012	good
Chile	0.012	good
China	0.006	good
Colombia	0.006	good
Costa Rica	0.071	acceptable
Czech Republic	0.025	good
Ecuador	0.031	good
Egypt	0.025	good
El Salvador	0.085	acceptable
France	0.000	excellent
Germany	0.012	good
Guatemala	0.078	acceptable
India	0.012	good
Israel	0.038	good
Italy	0.000	excellent
Japan	0.018	good
Mexico	0.000	excellent
Nicaragua	0.107	caution
Panama	0.099	acceptable
Peru	0.018	good
Poland	0.006	good
Russia	0.000	excellent
Saudi Arabia	0.038	good
South Africa	0.018	good
South Korea	0.018	good
Spain	0.018	good
Turkey	0.051	acceptable
United Kingdom	0.000	excellent
United States	0.006	good
Uruguay	0.051	acceptable
Venezuela	0.025	good

Table 3   Pillar values for all countries

Country	Internet Freedom and Openness	Digital Public Services	Digital Adoption	Privacy and Security	Digital Literacy	Digital Business	Inno-vation	Finance
Argentina	0.77	0.55	0.67	0.67	0.62	0.58	0.50	0.46
Australia	0.82	0.98	0.92	1.00	1.00	0.70	0.71	0.96
Brazil	0.79	0.59	0.70	0.53	0.49	0.68	0.49	0.55
Canada	1.00	1.00	0.96	0.81	0.88	0.76	0.93	0.98
Chile	0.57	0.74	0.67	0.69	0.73	0.87	0.65	0.88
China	0.51	0.59	0.68	0.49	0.53	0.49	0.64	0.81
Colombia	0.70	0.73	0.62	0.68	0.63	0.86	0.56	0.59
Costa Rica	0.50	0.62	0.48	0.77	0.61	0.84	0.53	0.49
Czech Republic	0.77	0.66	0.68	0.87	0.75	0.48	0.63	0.72
Ecuador	0.67	0.49	0.50	0.54	0.47	0.79	0.48	0.35
Egypt	0.53	0.56	0.45	0.57	0.46	0.42	0.48	0.50
El Salvador	0.46	0.58	0.49	0.52	0.40	0.58	0.66	0.51
France	0.81	0.79	0.82	0.64	0.94	0.65	0.91	0.79
Germany	0.79	0.71	0.92	0.76	0.93	0.69	0.91	0.79
Guatemala	0.42	0.43	0.40	0.52	0.40	0.79	0.59	0.45
India	0.65	0.54	0.45	0.45	0.43	0.59	0.71	0.63
Israel	0.66	0.82	0.76	0.82	0.85	0.61	0.91	0.92
Italy	0.73	0.58	0.70	0.59	0.79	0.52	0.67	0.58
Japan	0.95	0.75	0.69	0.89	0.76	0.41	0.81	0.73
Mexico	0.62	0.75	0.63	0.66	0.55	0.70	0.74	0.55
Nicaragua	0.45	0.57	0.32	0.55	0.42	0.61	0.45	0.45
Panama	0.47	0.47	0.54	0.50	0.50	0.91	0.73	0.61
Peru	0.41	0.50	0.63	0.65	0.49	0.88	0.57	0.57
Poland	0.49	0.62	0.65	0.57	0.66	0.52	0.52	0.63
Russia	0.92	0.57	0.67	0.72	0.82	0.42	0.47	0.57
Saudi Arabia	0.57	0.64	0.71	0.56	0.78	1.00	0.68	0.91
South Africa	0.82	0.61	0.45	0.70	0.45	0.61	0.63	0.60
South Korea	0.82	0.60	0.75	0.75	0.73	0.51	0.64	0.78
Spain	0.51	0.82	0.84	0.61	0.83	0.64	0.72	0.66
Turkey	0.56	0.55	0.62	0.52	0.55	0.52	0.77	0.82
United Kingdom	0.89	0.98	1.00	0.81	0.87	0.75	0.88	0.80
United States	0.95	1.00	0.98	0.97	0.94	0.81	1.00	1.00
Uruguay	0.45	0.72	0.61	0.74	0.69	0.64	0.53	0.57
Venezuela	0.52	0.49	0.57	0.44	0.60	0.71	0.45	0.35

Table 4   TIDL index KPIs and variables

KPI DESCRIPTION	VARIABLE	ADJUSTEMENT
Freedom of expression - Freedom on the Net	Internet Freedom	reverse value (100-X)
ISP market share of 1st market leader	ISP Market Openness	reverse value (1-X)
ISP market share difference between 1st and 2nd market leaders		reciprocal value (1/X)
Mobile OS market share of 1st market leader	Mobile OS Openness	reverse value (1-X)
MobileOS market share difference between 1st and 2nd market leaders		reciprocal value (1/X)
Mobile Search enginge market share of 1st market leader	Mobile Search Engine Openness	reverse value (1-X)
Mobile search engine market share difference between 1st and 2nd market leaders		reciprocal value (1/X)
e-government: government online service index	E-Government	
e-education: MOOC per population	E-Education	
e-education: Internet access in school		
Domain names on Internet	Internet Adoption Domain Names	
Internet penetration at individual level	Internet Adoption Individual	
Internet penetration at household level	Internet Adoption Houshold	
Fixed BB penetration rate		
Mobile penetration rate	Mobile Adoption	
Mobile BB penetration rate		
TEF Q - digital variety: Possessing desktop computer (% of population, TEF Q1)	Device Adoption_Computer	
TEF Q - digital variety: Possessing laptop computer (% of population TEF Q2)	Device Adoption_Laptop	
TEF Q - digital variety: Possessing smartphone (% of population TEF Q4)	Device Adoption_Smartphone	
TEF Q - digital variety: Possessing tablet (% of population TEF Q3)	Device Adoption_Tablet	
Social Media Usage	Service Adoption	
Privacy Regulation vs. User Perception	Privacy	
Software piracy rate	Security	reverse value (1-X)
Secure internet servers		
Malware infection removal rate	Infection	reverse value (1-X)

Malware encounter rate		reverse value (1-X)
Local infection rate		reverse value (1-X)
Staff training	Staff Training	
Quality of math science	Quality Of Education	
Secondary school enrolment	School Enrolment	
Tertiary enrolment		
Use of virtual networks	Use Of Virtual Network	
Wiki uploads	Open Platform Use	
Open office use		
Education*Attitude	Education*Attitude	
TEF Q – cutting edge technology	Cutting Edge Technology	
B2b internet use	Business Use Of Internet	
B2c internet use		
Impact of ICTs on new business model	Impact Of ICT	
Impact of ICTs on new org model		
TEAOPP*Attitude	Teaopp*Attitude	
Capacity for innovation	Innovation Capacity	
GERD – R&D expenditure/GDP		
Computer software spending /GDP	Software Spending	
Impact of ICTs on new services and products	ICT Impact And Application	
IP-Patent in ICT		
No of application of ICT patent		
Availability of latest technologies	Technology Availability	
Firm-level tech absorption	Technology Absorption	
Innov* Attitude	Innov* Attitude	
VC availability	Vc Availability	
Depth of capital markets	Depth Of Capital Markets	
Infinv* Attitude	Infinv* Attitude	

Table 5   Description of TIDL KPIs, Variables, and Data Sources

			OPENNESS		
VARIABLE	KPI	SOURCE	DESCRIPTION	SOURCE WEBSITE	DATE
Internet Freedom and Openness					
Internet Freedom	Freedom of expression - Freedom on the Net	Freedom on the Net	Freedom on the Net measures the level of Internet and digital media freedom in 65 countries. Each country receives a score from 0 (the most free) to 100 (the least free), which serves as the basis for an Internet freedom status designation of FREE (0-30 points), PARTLY FREE (31-60 points), or NOT FREE (61-100 points).	https://freedomhouse.org/report/freedom-net/freedom-net-2015	2015
ISP Market Openness	ISP market share of 1st market leader	The Statistics Portal	Market share of the most dominant leader in ISP market in a given country	http://www.statista.com/statistics/326147/number-of-broadband-subscribers-in-australia/	2013 Q3-Q4
	ISP market share difference between 1st and 2nd market leaders	The Statistics Portal	ISP market share difference between 1st and 2nd dominant market leaders	http://www.statista.com/statistics/326147/number-of-broadband-subscribers-in-australia/	2013 Q3-Q4
Mobile OS Openness	Mobile OS market share of 1st market leader	Global Statcounter	Market share of the most dominant leader in Mobile OS market in a given country	http://gs.statcounter.com/	2015
	MobileOS market share difference between 1st and 2nd market leaders	Global Statcounter	Mobile OS market share difference between 1st and 2nd dominant market leaders	http://gs.statcounter.com/	2015
	Mobile Search enginge market	Global Statcounter	Market share of the most dominant leader in Mobile search engine market in a given country	http://gs.statcounter.com/	2015

Mobile Search Engine Openness	share of 1st market leader				
	Mobile search engine market share difference between 1st and 2nd market leaders	Global Statcounter	Mobile search engine market share difference between 1st and 2nd dominant market leaders	http://gs.statcounter.com/	2015
Digital Public Services					
E-government	e-government online service index	WEF - Global Information Technology Report Data, Network Readiness Report	The Government Online Service Index assesses the quality of government's delivery of online services on a 0-to-1 (best) scale	http://reports.weforum.org/ global-information- technology-report-2015/	2010-2013
E-education	e-education: MOOC per population	HarvardX	Nesterko, S. O., Seaton, D. T., Kashin, K., Han, Q., Reich, J., Waldo, J., Chuang I., & Ho, A. D. (2014). World Map of Enrolment (HarvardX Insights). The map above shows estimated enrolment numbers from each country for all HarvardX offerings. Total course registration is listed in the bottom left. Mouse-pointing (or tapping) at a country will reveal the estimated number of registrants from that country.	http://harvardx.harvard.edu /harvardx-insights/world- map-enrolment	2015, 22 Nov
	e-education: Internet access in school	WEF - Global Information Technology Report Data, Network Readiness Report	In your country, how widespread is Internet access in schools? [1 = nonexistent; 7 = extremely widespread]	http://reports.weforum.org/ global-competitiveness- report-2014-2015/	2010-2014

			CONFIDENCE		
VARIABLE	KPI	SOURCE	DESCRIPTION	SOURCE WEBSITE	DATE
Digital Adoption					
Internet adoption domain names	Domain names on Internet	webhosting.info	Number of active Internet domain registrations per 1000 number of populaiton Country-wise Total Domains Data as of 07/20/15	http://www.webhosting.info/ domains/country_stats/	2015
Internet adoption Individual	Internet penetration at individual level	ICT Development Index (IDI) indicators	Includes users who have accessed the Internet over the last twelve months, and excludes users who have not accessed the Internet since one year previously. Generally based on survey data.	http://www.itu.int/en/ITU-D/Statistics/Pages/stat/defaul t.aspx	2007-2013
Internet adoption Houshold	Internet penetration at household level	ICT Development Index (IDI) indicators	This is the proportion of households with Internet access at home. The Internet is a worldwide public computer network. It provides access to a number of communication services including the World Wide Web and carries e-mail, news, entertainment and data files, irrespective of the device used (not assumed to be only via a computer – it may also be by mobile telephone, tablet, PDA, games machine, digital TV etc.). Access can be via a fixed or mobile network.	http://www.itu.int/en/ITU-D/Statistics/Pages/stat/defaul t.aspx	2007-2013
	Fixed BB penetration rate	ITU ICT Development Index indicator 2007-2013	Fixed (wired) broadband network: refers to technologies at advertised download speeds of at least 256 kbit/s, such as DSL, cable modem, high speed leased lines, fibre-to-the-home/building, powerline and other fixed (wired) broadband	http://www.itu.int/en/ITU-D/Statistics/Pages/stat/defaul t.aspx	2007-2013
Mobile Adoption	Mobile penetration rate	ICT Development Index (IDI) indicators	Mobile cellular telephone subscriptions are subscriptions to a public mobile telephone service that provide access to the PSTN using cellular technology. The indicator includes (and is split into) the number of postpaid subscriptions, and the number of active prepaid accounts (i.e. that have been used during the last three months). The indicator applies to all mobile cellular subscriptions that offer voice communications. It excludes subscriptions via data cards or USB modems, subscriptions to public mobile data services, private trunked mobile radio, telepoint, radio paging and telemetry services.	http://www.itu.int/en/ITU-D/Statistics/Pages/stat/defaul t.aspx	2007-2013

	Mobile BB penetration rate	ITU ICT Development Index indicator 2007-2013	Measures both standard mobile broadband and dedicated mobile broadband subscriptions to the public Internet. Covers actual subscribers, not potential subscribers, even though the latter may have broadband-enabled handsets.	http://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx	2007-2013
Device adoption_computer	TEF Q - digital variety: Possessing desktop computer (% of population, TEF Q1)	Telefónica quastionnaire	Table g64[{q64}].mA - Desktop computer : What kind of access do you have to each of the following technological devices? Please select all that apply. I own it (used) It's shared – family, friends etc. Through school/university Public access Through work I do not have access to this device		2013-2014
Device adoption_Laptop	TEF Q - digital variety: Possessing laptop computer (% of population TEF Q2)	Telefónica quastionnaire	Table g64[{q65}].mA - Laptop computer : What kind of access do you have to each of the following technological devices? Please select all that apply. I own it (used) It's shared – family, friends etc. Through school/university Public access Through work I do not have access to this device		2013-2014
Device adoption_smartphone	TEF Q - digital variety: Possessing smartphone (% of population TEF Q4)	Telefónica quastionnaire	Table g64[{q67}].mA - Smartphone : What kind of access do you have to each of the following technological devices? Please select all that apply. I own it (used) It's shared – family, friends etc. Through school/university Public access Through work I do not have access to this device		2013-2014

Device adoption_tablet	TEF Q - digital variety: Possessing tablet (% of population TEF Q3)	Telefónica quastionnaire	Table g64[{q66}].mA - Tablet : What kind of access do you have to each of the following technological devices? Please select all that apply. I own it (used) It's shared – family, friends etc. Through school/university Public access Through work I do not have access to this device		2013-2014
Service Adoption	Social Media usage	Statista	Social network users as % of Internet users or as % of total individuals		2015
Privacy and Security					
Privacy	Privacy Regulation vs. User Perception	DLAPIPER / TEF Q - ATTITUDE TOWARD PRIVACY	DATA PROTECTION LAWS OF THE WORLD, regulation & enforcement: heavy = 4, robust = 3, moderate = 2, limited =1, higher value is better CyberTrak provides multinational companies instant online access to critical information about cybersecurity-related laws, regulations and generally accepted standards in 23 key markets in the Americas, Asia-Pacific, Europe and the Middle East and in four highly regulated sectors in the US. It also provides brief summaries of requirements, as well as an assessment on enforcement risk and the degree of activity triggering the requirement. TEF Q: How strongly do you agree or disagree with the following statement? Overall I am concerned about the security and privacy of my data and information online	http://www.dlapiperdataprotection.com/#handbook/world-map-section	2013-2014
Security	Software piracy rate	WEF - Global Information Technology Report Data, Network Readiness Report	Unlicensed software units as a percentage of total software units installed	http://reports.weforum.org/global-information-technology-report-2015/	2010-2013

	Secure Internet servers	Netcraft	Secure servers are servers using encryption technology in Internet transactions.	http://databank.worldbank.org/data/views/reports/tableview.aspx (http://www.netcraft.com/)	2000-2014
Infection	Malware infection removal rate	Microsoft Security Intelligence Report	Infection rates for locations around the world, 3Q14–4Q14, by quarter (100,000 computers reporting minimum)	http://www.microsoft.com/security/sir/default.aspx	2014
	Malware encounter rate	Microsoft Security Intelligence Report	Encounter rates for locations around the world, 3Q14–4Q14, by quarter (100,000 computers reporting minimum)	http://www.microsoft.com/security/sir/default.aspx	2014
	Local infection rate	Kaspersky	Data shows the percentages of users on whose devices Kaspersky Lab products intercepted Local infections in the Last 24 hours. KL products' users are always protected from all – even the very latest – threats.	https://securelist.com/statistics/	2015

			DIGITAL ENTREPRENEURSIP		
VARIABLE	KPI	SOURCE	DESCRIPTION	SOURCE WEBSITE	DATE
Digital Literacy					
Staff Training	Staff training	World Economic Forum, Executive Opinion Survey, 2010-11, 2011-12, 2012-13 and 2013-14 editions	In your country, to what extent do companies invest in training and employee development? [1 = not at all; 7 = to a great extent]	http://reports.weforum.org/global-information-technology-report-2015/	2010-2014
Quality of Education	Quality of math science	World Economic Forum, Executive Opinion Survey, 2010-11, 2011-12, 2012-13 and 2013-14 editions	In your country, how would you assess the quality of math and science education in schools? [1 = extremely poor—among the worst in the world; 7 = excellent—among the best in the world]	http://reports.weforum.org/global-information-technology-report-2015/	2010-2014
School Enrolment	Secondary school enrolment	ICT Development Index (IDI) indicators	Total enrolment in a specific level of education as a percentage of all eligible	http://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx	2007-2013
	Tertiary enrolment	ICT Development Index (IDI) indicators	Total enrolment in a specific level of education as a percentage of all eligible	http://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx	2007-2013
Use of Virtual Network	Use of virtual network	WEF - Global Information Technology Report Data	In your country, how widely used are virtual social networks (e.g., Facebook, Twitter, LinkedIn)? [1 = not used at all; 7 = widely used]	http://reports.weforum.org/global-information-technology-report-2015/	2010-2014

Open Platform Use	Wiki uploads	Global Innovation Index, Wikimedia Foundation; United Nations, Department of Economic and Social Affairs, Population Division, World Population Prospects: The 2012 Revision (population data).	Wikipedia monthly page edits (per million population 15–69 years old). Data extracted from Wikimedia Traffic Analysis Report, Wikipedia Page Edits per Country, Overview on the portal www. wikipedia.org. The count of monthly page edits data is based on a 1:1,000 sampled server log (squids), averages of quarterly reports. Wikimedia Foundation (WMF) traffic logging service suffered from server capacity problems in August/ September/October 2011. Data loss occurred only during peak hours. It therefore may have had a somewhat different impact for traffic from different parts of the world. From mid-September until late November, squid log records for mobile traffic were in invalid format. Data could be repaired for logs from mid-October onwards. Older logs were no longer available. In an unrelated server outage, precisely half of traffic to WMF mobile sites was not counted from 16 October–29 November (one of two load-balanced servers did not report traffic). Countries are included only if the number of page edits in the period exceeds 100,000 (100 matching records in 1:1,000 sampled log). Page edits by bots are not included. Also all IP addresses that occur more than once on a given day are discarded for that day. A few false negatives are taken for granted.	(http://stats.wikimedia.org/wikimedia/squids/ SquidReportsCountriesLanguagesVisitsEdits. htm; http://esa.un.org/unpd/wpp/ Excel-Data/ population.htm)	2013
	Open office use	The Free and Open Productivity Suite	The download figures are for full-install downloads of Apache OpenOffice downloaded via SourceForge standardized by 1000 of populations. This does not include downloads of language pack, SDK's or source tarballs. It does not include downloads of earlier versions of OpenOffice.org or downloads made from copies of OpenOffice hosted on other repositories.	https://www.openoffice.org/stats/countries.html	2015
Education* Attitude	Education*Attitude	Global Entrepreneurship Monitor (GEM)	GEM Data – education level of entrepreneurs* GEM ATTITUDE (average: opportunity recognition, education level of population, networking, risk perception, and entrepreneurial career and status recognition)	http://www.gemconsortium.org/data	2013-2014 average

Digital Business

Cutting Edge Technology	TEF Q – cutting edge technology	TELEFÓNICA QUESTIONNAIRE	How much do you agree or disagree with the following statement? I am on the cutting edge of technology - Strongly agree (used) Somewhat agree Somewhat disagree Strongly disagree		2013-2014
Business Use of Internet	B2b Internet use	World Economic Forum, Executive Opinion Survey, 2011-12, 2012-13 and 2013-14 editions	In your country, to what extent do businesses use ICTs for transactions with other businesses? [1 = not at all; 7 = to a great extent]	http://reports.weforum.org/global-information-technology-report-2015/network-readiness-index/	2013–14 weighted average
	B2c Internet use	World Economic Forum, Executive Opinion Survey, 2011-12, 2012-13 and 2013-14 editions	In your country, to what extent do businesses use the Internet for selling their goods and services to consumers? [1 = not at all; 7 = to a great extent]	http://reports.weforum.org/global-information-technology-report-2015/network-readiness-index/	2011-2014
Impact of ICT	Impact of ICTs on new business model	Global Innovation Index	Average answer to the question: In your country, to what extent do ICTs enable new business models? [1 = not at all; 7 = to a great extent]	https://www.globalinnovationindex.org/content.aspx?page=GII-Home	2011-2014
	Impact of ICTs on new org model	World Economic Forum, Executive Opinion Survey, 2011-12, 2012-13 and 2013-14 editions	In your country, to what extent do ICTs enable new organizational models (e.g., virtual teams, remote working, telecommuting) within businesses? [1 = not at all; 7 = to a great extent]	http://reports.weforum.org/global-information-technology-report-2015/network-readiness-index/	2011-2014
TEAOPP*Attitude	TEAOPP*Attitude	Global Entrepreneruiship Monitor (GEM)	GEM Data – Opp Startup * GEM ATTITUDE (average: opportunity recognition, education level of population, networking, risk perception, and entrepreneurial career and status recognition)	http://www.gemconsortium.org/data	2013-2014 average

Innovation

Innovation Capacity	Capacity for innovation	WEF - Global Information Technology Report Data, Network Readiness Report	In your country, to what extent do companies have the capacity to innovate? [1 = not at all; 7 = to a great extent]	http://reports.weforum.org/global-information-technology-report-2015/	2010-2014
	GERD – R&D expenditure/ GDP	Global Innovation Index	GERD: Gross expenditure on R&D (% of GDP) | 2011 Total domestic intramural expenditure on R&D during a given period as a percentage of GDP. Intramural R&D expenditure is all expenditure for R&D performed within a statistical unit or sector of the economy during a specific period, whatever the source of funds.	http://stats.uis. unesco.org	2003-2012
Software Spending	Computer software spending /GDP	Global Innovation Index	Total computer software spending (% of GDP)a | 2012 Computer software spending includes the total value of purchased or leased packaged software such as operating systems, database systems, programming tools, utilities, and applications. It excludes expenditures for internal software development and outsourced custom software development. The data are a combination of actual figures and estimates. Data are reported as a percentage of GDP.	(http://www.ihsglobalinsight. com/ProductsServices/Produ ctDetail2370. htm; http://www.imf.org/external/ pubs/ft/ weo/2013/01/weodata/down load.aspx)	2012
ICT Impact and Application	Impact of ICTs on new services and products	WEF - Global Information Technology Report Data, Network Readiness Report	To what extent are ICTs creating new business models, services and products in your country? [1 = not at all; 7 = a significant extent]	http://reports.weforum.org/global-information-technology-report-2015	2010-2014
	IP-Patent in ICT	World Intellectual Property Organization	Pat/million POP IN DIGITAL TECHNOLOGY, COMMUNICATION AND COMPUTERS, sum of 6 years	http://www.wipo.int/ipstats/ en/	2008-2013
	No of application of ICT patent	WEF - Global Information Technology Report Data, Network Readiness Report	Number of applications for information and communication technology–related patents filed under the Patent Cooperation Treaty (PCT) per million population	http://reports.weforum.org/global-information-technology-report-2015/	2008-2012
Technology Availability	Availability of latest technologies	WEF - Global Information Technology Report Data, Network Readiness Report	In your country, to what extent are the latest technologies available? [1 = not available at all; 7 = widely available]	http://reports.weforum.org/global-information-technology-report-2015/	2010-2014

Technology Absorption	Firm-level tech absorption	WEF - Global Information Technology Report Data, Network Readiness Report	In your country to what extent do businesses adopt new technology? 1= not at all, 7=adopt extensively	http://reports.weforum.org/global-information-technology-report-2015/	2010-2014
Innov*Attitude	Innov* Attitude	Global Entrepreneruship Monitor (GEM)	GEM Data: Innov (average: new product , new tech, tech level) * GEM ATTITUDE (average: opportunity recognition, education level of population, networking, risk perception, and entrepreneurial career and status recognition)	http://www.gemconsortium.org/data	2013-2014 average
Finance					
VC Availability	VC availability	WEF - Global Information Technology Report Data, Network Readiness Report	In your country, how easy is it for entrepreneurs with innovative but risky projects to find venture capital? [1 = extremely difficult; 7 = extremely easy]	http://reports.weforum.org/global-information-technology-report-2015/	2010-2014
Depth of Capital Markets	Depth of capital markets	The Venture Capital and Private Equity Index 2014 by Alexander Groh, Heinrich Liechtenstein, Karsten Lieser and Markus Biesinger --	The depth of capital market is one of the six sub-indices of the Venture Capital and Private Equity Index. This variable is a complex measure of the size and liquidity of the stock market, level of IPO, M&A, and debt and credit market activity. The dataset is provided by Alexander Groh.	http://blog.iese.edu/vcpeindex/	2014
Infinv* Attitude	Infinv* Attitude	Global Entrepreneruship Monitor (GEM)	GEM Data: Informal investment * GEM ATTITUDE (average: opportunity recognition, education level of population, networking, risk perception, and entrepreneurial career and status recognition)	http://www.gemconsortium.org/data	2013-2014 average