



# ***Aggregate Capital Sufficiency and National Well-Being***

*How Assessing Impacts on Vital  
Capitals Can Be a Better Indicator  
of Societal Well-Being Than GDP*

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April 10, 2020  
(v1.1)

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# Introduction



# Executive Summary

- In 2017, we partnered with Ernst & Young to pilot, test and evaluate the use of the [MultiCapital Scorecard \(MCS\)](#) as a tool for assessing well-being in a country – a [context-based](#) tool!
  - Intent was to assess the utility of the MCS for use in evaluating the impacts of the [Fourth Industrial Revolution \(4IR\)](#) on a country's national well-being
  - The MCS had earlier been put forward as a tool for assessing [Aggregate Capital Sufficiency \(ACS\)](#) at a national level, a triple bottom line alternative to GDP
- Four countries were chosen for study: U.S., Argentina, Rwanda and Estonia
  - Each had already experienced a technological revolution of some kind in recent years



# The 4 Countries We Looked At

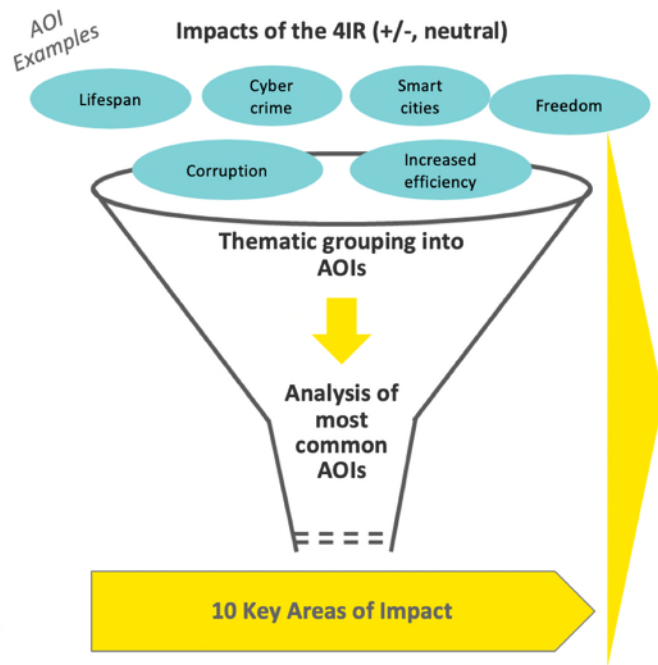


Source: Ernst & Young



# Materiality Determination

We conducted a materiality assessment of significant impacts of the 4IR as identified by the WEF through a survey of 800 executives.\* Our assessment narrowed the list of impacts to 10 of the most material areas of impact (AOIs) for the 4IR. We then identified one or more metric(s) commonly used to assess each one. We prioritized metrics for which a time-series of publicly available data exists to enable testing of proposed metrics. Due to poor data availability for metrics associated with certain AOIs, we identified reasonable alternative or proxy metrics for which data was available. Throughout this engagement we noted that data availability, particularly for impacts unique to the 4IR, is a key gap that will influence evaluation of 4IR outcomes.



AOIs	Original emblematic metrics	Final emblematic metrics
Health	Life Expectancy	Life expectancy
Social/Culture	Leisure Time	<ol style="list-style-type: none"> <li>1. % of urban population with access to improved sanitation facilities</li> <li>2. % of individuals using the internet</li> <li>3. % of women in wage employment in the nonagricultural sector</li> </ol>
Business Productivity	Labor Productivity	GDP per capita
Jobs	Unemployment Rate	Unemployment Rate
Environment	GHG Emissions	GHG Emissions
Equality	Gini co-efficient	Gini co-efficient
Freedom & Transparency	Voice & Accountability	Voice & Accountability
Governance	Democratization	No sufficient proxies available
Privacy	Privacy Infringement	No sufficient proxies available
Security/Crime	Data Security	Intentional homicides

\*Documented in *The Fourth Industrial Revolution* (2016) by Klaus Schwab, Founder and Executive Chairman of the World Economic Forum

Source: Ernst & Young

Note: WEF = World Economic Forum

# Scorecard Design & Scoring

An annual scorecard is produced for each year in which impacts in ten Areas of Impact (AOIs) are assessed relative to Sustainability Norms...

Vital capitals*			A	B	C	D			
BOTTOM LINE	AREAS OF IMPACT	CAPITAL IMPACTS	Progression score	Weight	Weighted score (AxB)	Fully sustainable score (BxC)	Gap to fully sustainable (D-C)	Area of Impact (AoI) bottom line (C/D)	TRIPLE BOTTOM LINE SCORES
			SOCIAL	Health: Life Expectancy	Human	2	5	10	15
Freedom & Transparency: Voice & Accountability	Social & Relationship	-2		3	-6	9	15	-67%	
Social-Culture: Urban Sanitation	Human	1		1.6	1.6	4.8	3.2	33%	
Social-Culture: Internet Access	Human	1		1.6	1.6	4.8	3.2	33%	
Security-Crime: Homicides	Human	1		2.8	2.8	8.4	5.6	33%	
ECONOMIC	Social-Culture: % Women in Non-Ag Workforce	Internal Economic-Nonfinancial	3	1.6	4.8	4.8	0	100%	-1%
	Equality: Income	External Economic-Financial	1	3	3	9	6	33%	
	Jobs: Unemployment Rate	Internal Economic-Financial	-1	3.7	-3.7	11.1	14.8	-33%	
	Business Productivity: GDP/Capita	External Economic-Financial	-1	4.6	-4.6	13.8	18.4	-33%	
ENVIRONMENTAL	Environment: GHG Emissions	Natural	1	3.2	3.2	9.6	6.4	33%	33%
<b>OVERALL PERFORMANCE</b>					12.7	90.3	77.6		<b>14%</b>

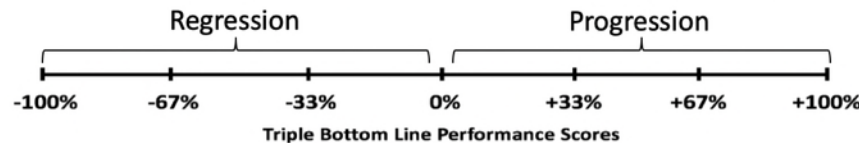
\*Intellectual Capital is typically embedded in most of the others.  
Source: Thomas & McElroy LLC

... using a 7-point Progression Performance scale

NUMERIC SCORE	SCORE DEFINITION
+3	Meeting or exceeding the sustainability norm for the year
+2	Meeting or exceeding the year's trajectory target, but falling short of the sustainability norm
+1	Improving upon the previous year's performance, but not meeting the year's trajectory target, or any year of improving performance, while having no such targets at all (sustainability norms or trajectory targets)
0	Maintaining the previous year's performance, while not meeting the year's trajectory target
-1	A 1-year regression in performance, while not meeting the year's trajectory target
-2	A 2-year regression in performance, while not meeting the year's trajectory target
-3	A 3-or-more year regression in performance, while not meeting the year's trajectory target, or any year of worsening performance while having no such targets at all (sustainability norm or trajectory target)

Source: Thomas & McElroy LLC

Impact scores are then weighted and compared to the best possible scores in each case: scores that equal best possible = +100%; scores that equal worst possible = -100%



Source: Thomas & McElroy LLC



# The Measurements We Took

- In each case, we applied the MCS over a range of 15–20 years before, during and after the technological revolution of interest in each country
  - Resulted in production of 15 to 20 *Aggregate Capital Sufficiency (ACS)* reports for each country
  - Together, these reports described the status of, and changes in, the sufficiency of vital capital resources in each area of impact (AOI) on a year-over-year basis
  - In addition, results were reported for each of the three bottom lines (TBL) in each case, and also for capital sufficiency as a whole using a single numeric score
    - e.g., for Argentina in 2009, its MCS/ACS scores were:

- Social: 24%
- Economic: -1%
- Environmental: 33%
- Overall TBL: 14%

See preceding slide  
for illustration of  
Argentina's 2009  
MCS/ACS report

Capital sufficiency is  
a reliable indicator  
of human well-being!

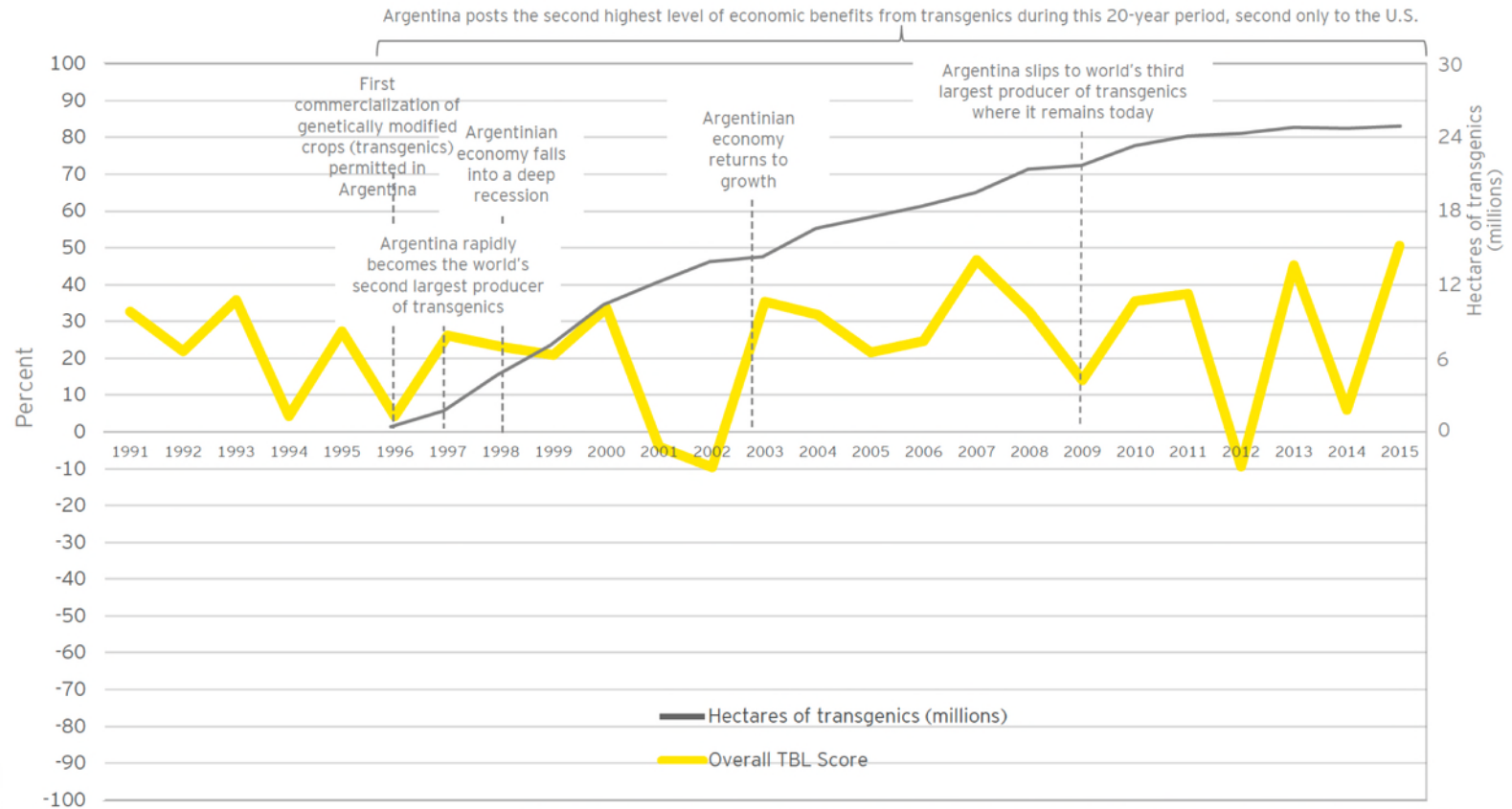




# Country-Level Case Study Results



# Argentina (1/3)



Source: Ernst & Young

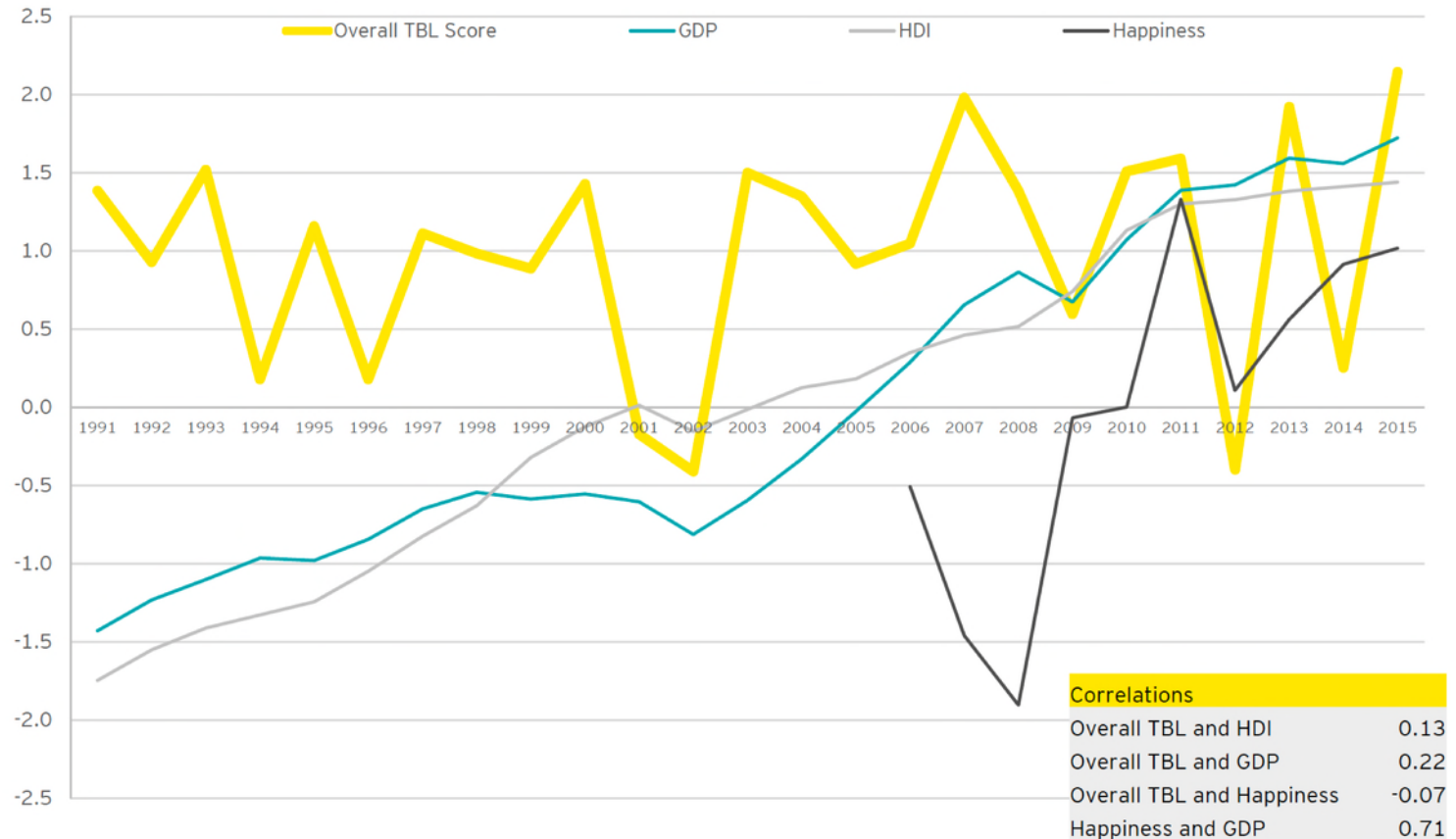
**NOTE:** This graph is an overlay of the TBL score and key historic events to provide historical context; it does not presume or suggest a causal relationship between events that occurred and the TBL score.

# Argentina (2/3)



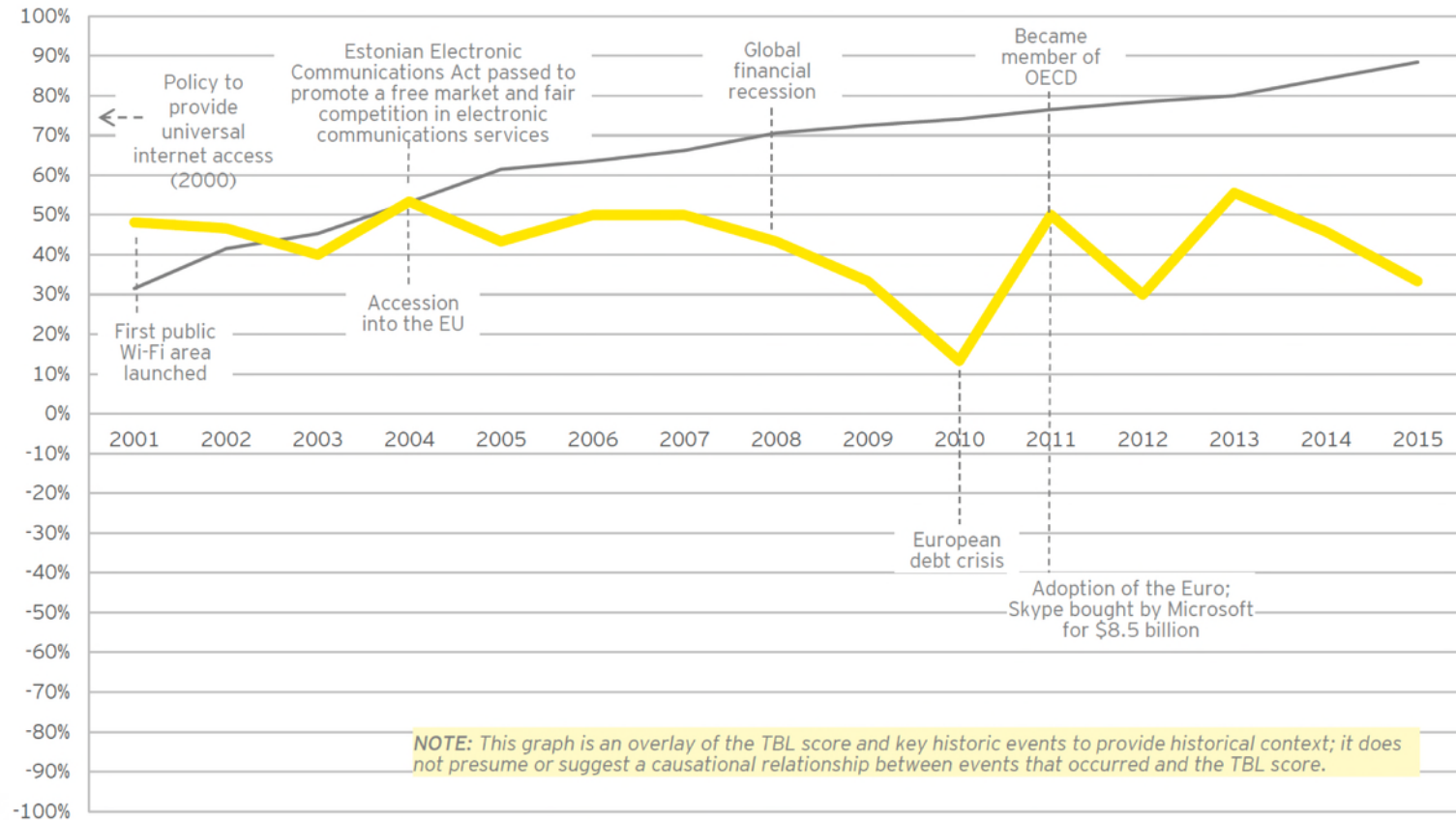
# Argentina (3/3)

NOTE: Graph shows standardized data to allow for comparison of trends; actual scales vary for each data set.



Source: Ernst & Young

# Estonia (1/3)

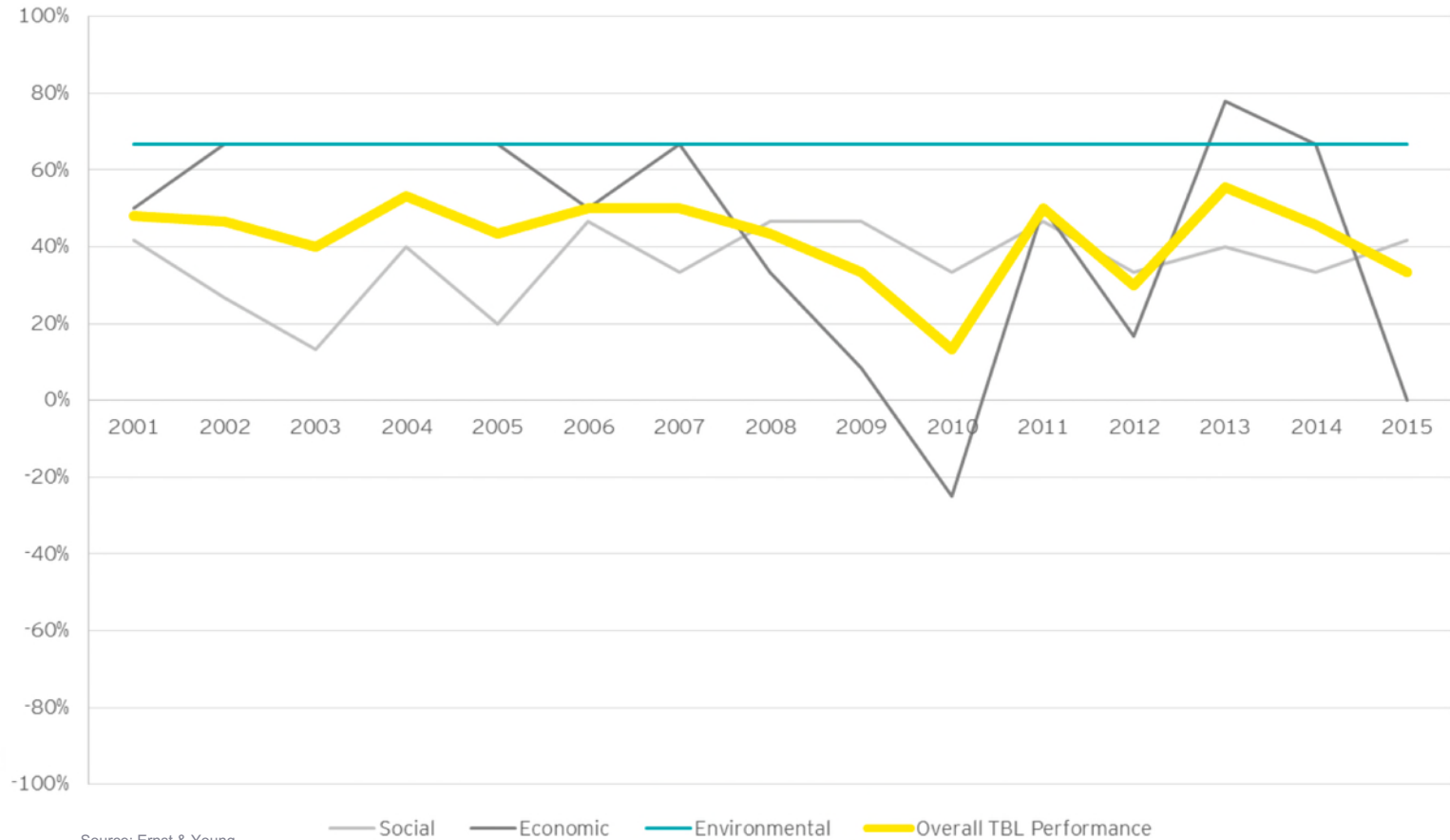


Source: Ernst & Young

— Internet users (% of population)

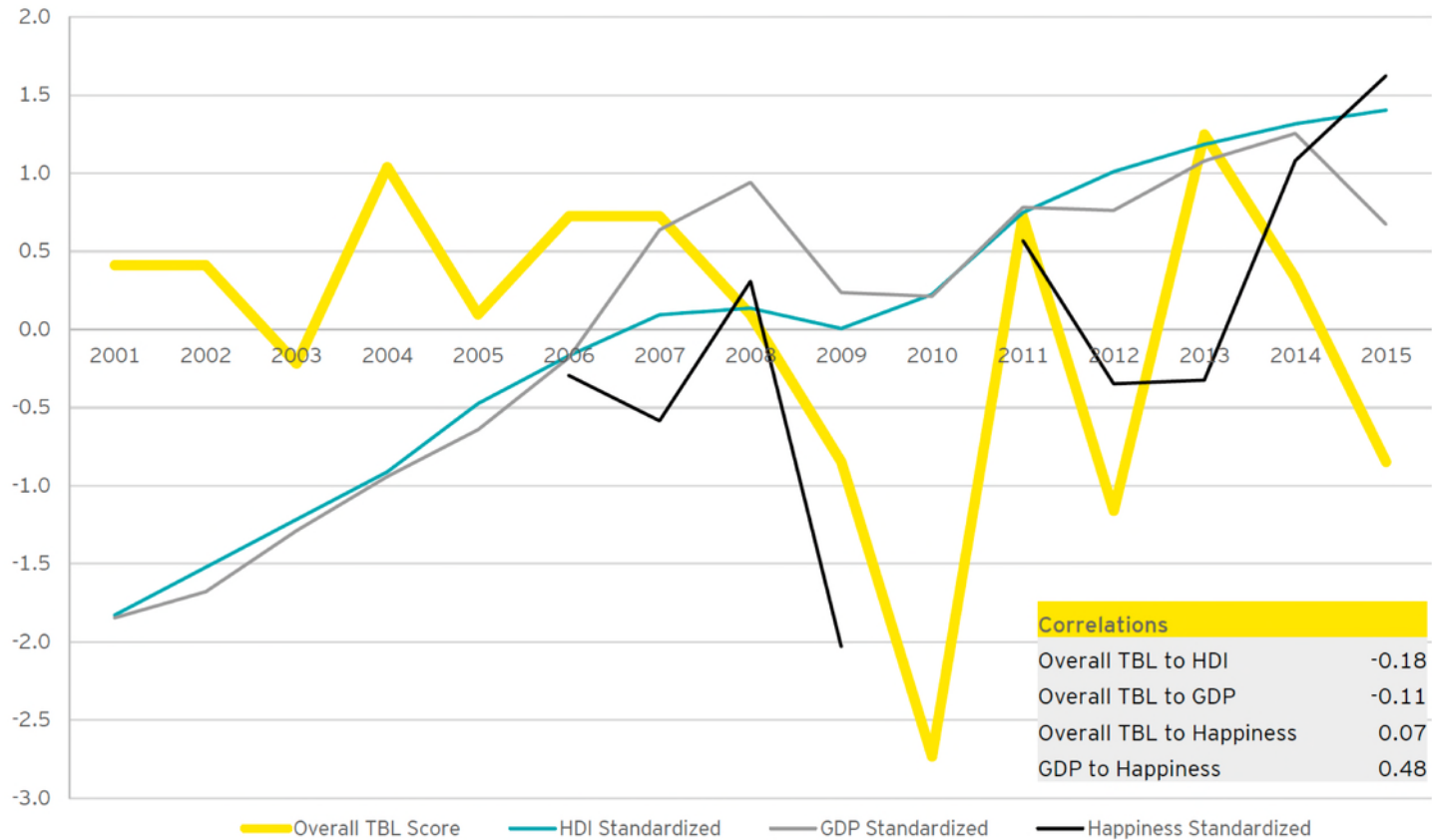
— Overall TBL Performance

# Estonia (2/3)



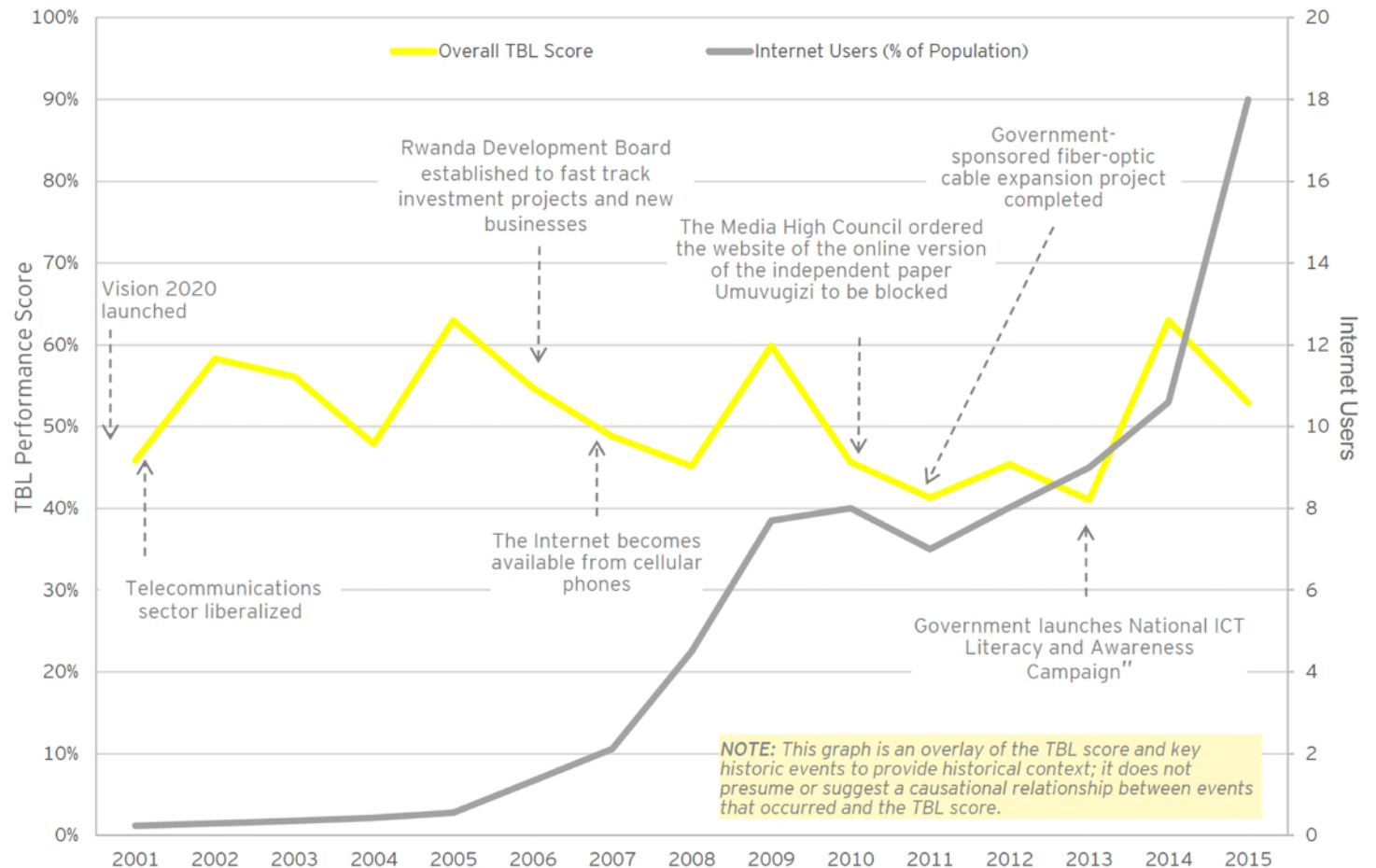
# Estonia (3/3)

NOTE: Graph shows standardized data to allow for comparison of trends; actual scales vary for each data set.



Source: Ernst & Young

# Rwanda (1/3)



Source: Ernst & Young



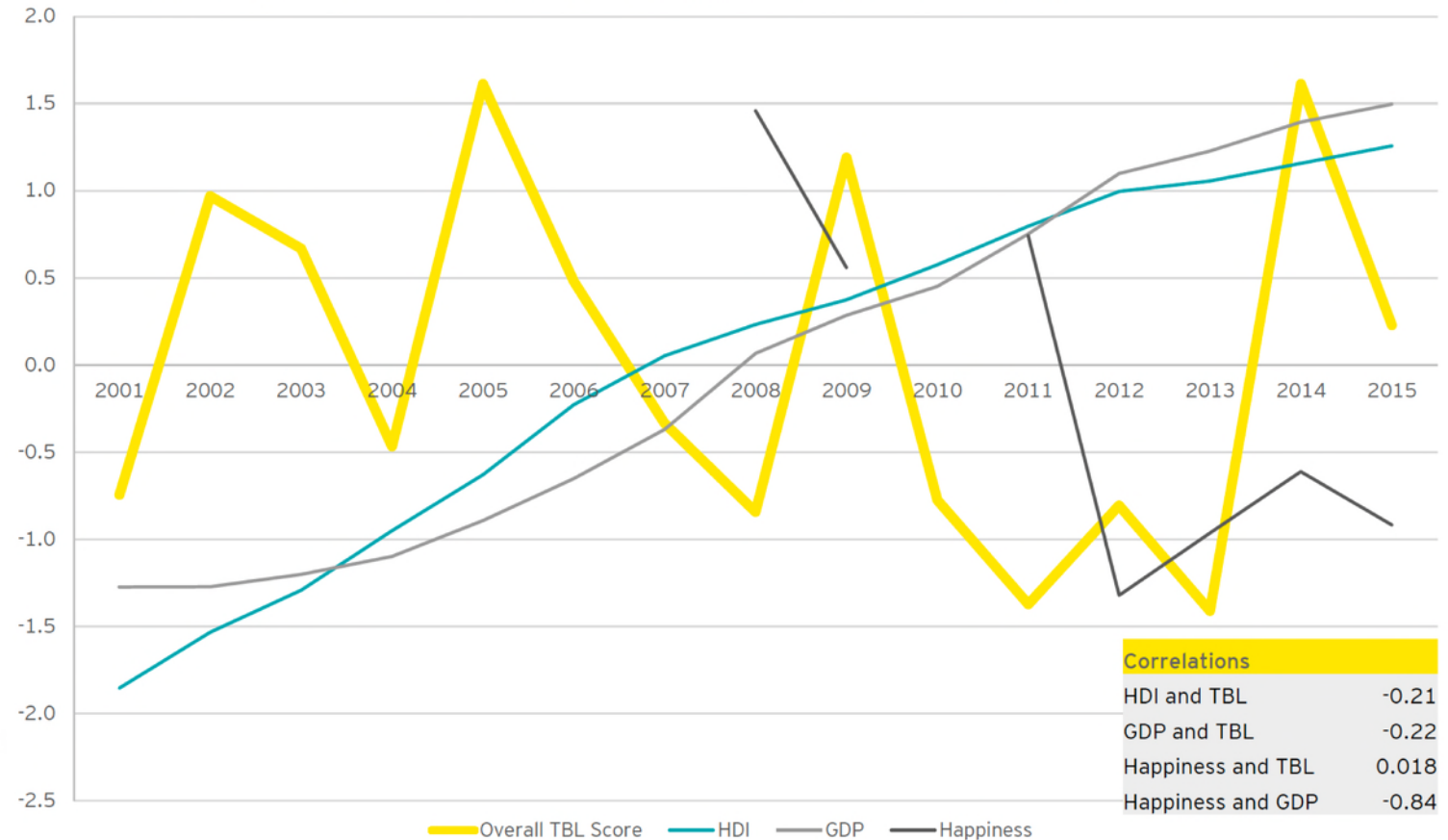
# Rwanda (2/3)



Source: Ernst & Young

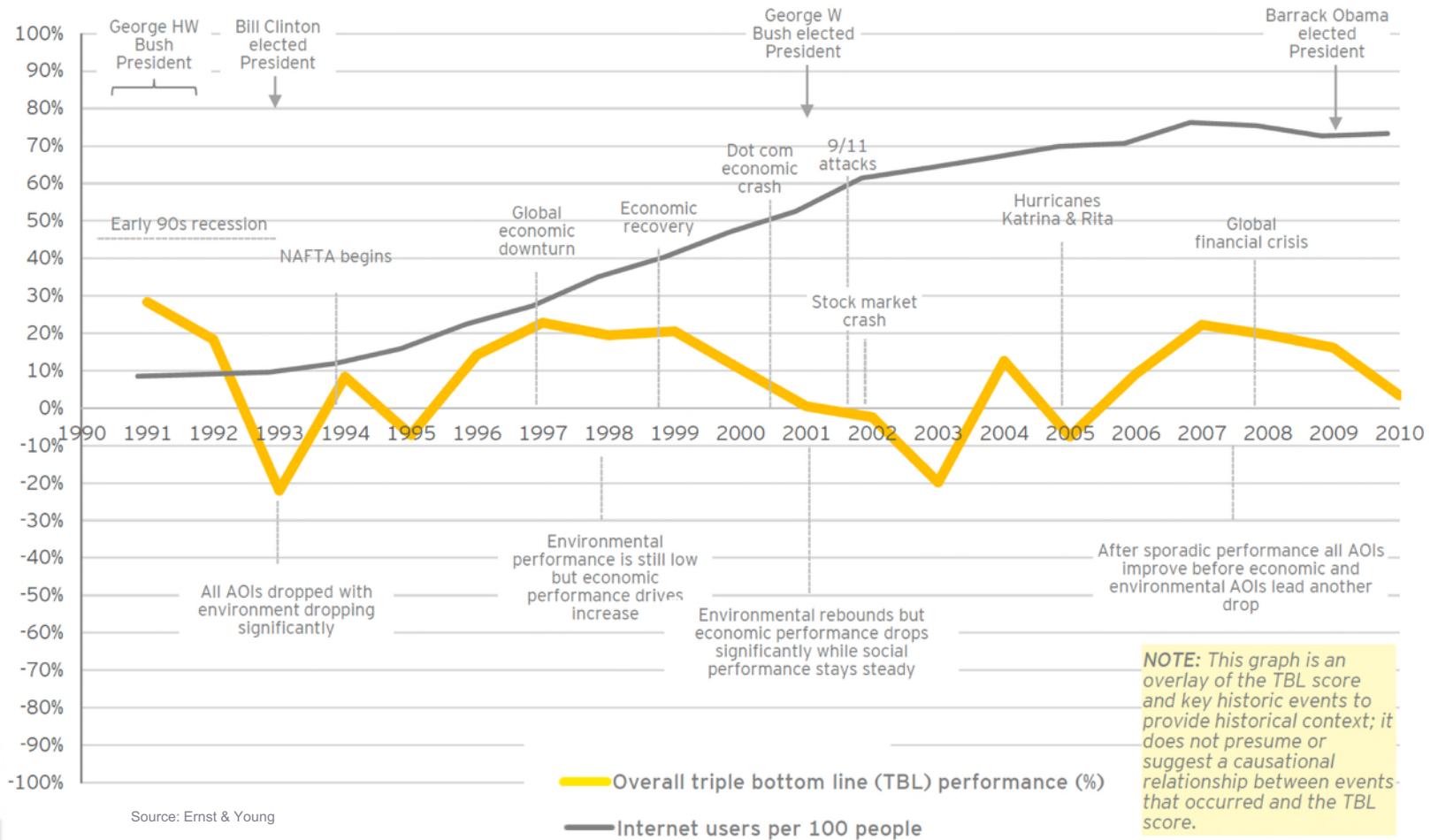
# Rwanda (3/3)

NOTE: Graph shows standardized data to allow for comparison of trends; actual scales vary for each data set.

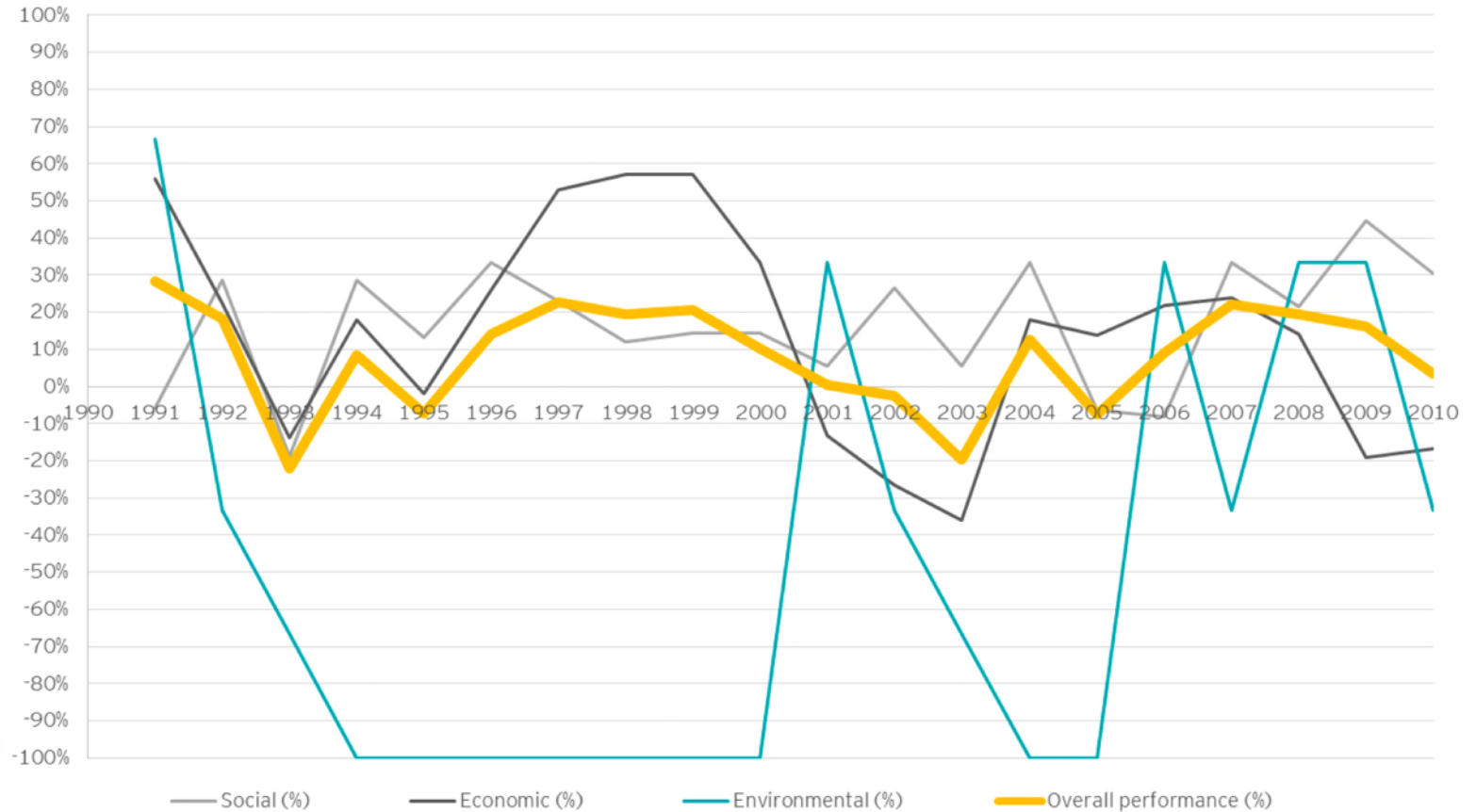


Source: Ernst & Young

# United States (1/3)



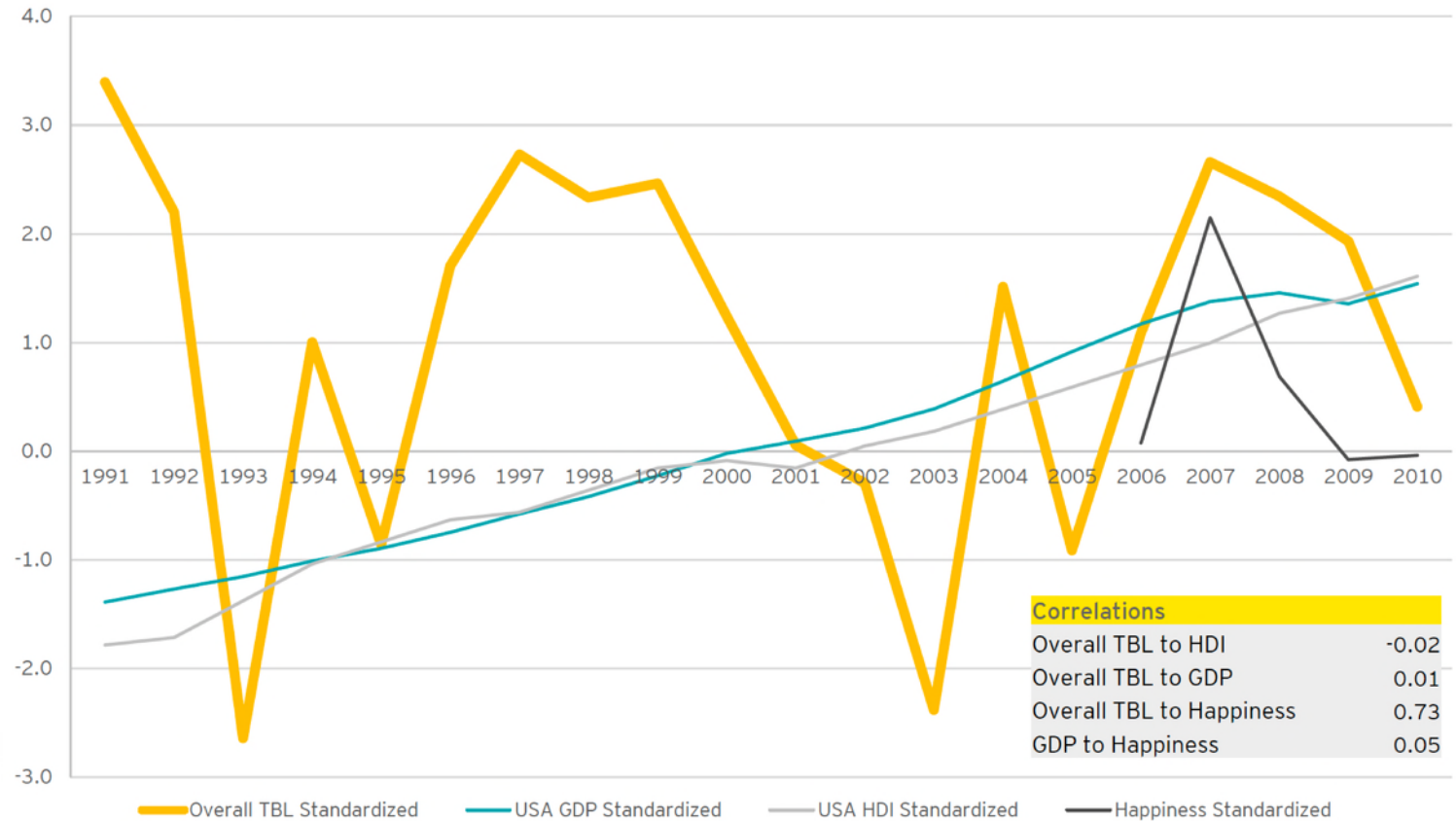
# United States (2/3)



Source: Ernst & Young

# United States (3/3)

NOTE: Graph shows standardized data to allow for comparison of trends; actual scales vary for each data set.



Source: Ernst & Young

# Conclusions



# Conclusions (1/2)

- This study provides empirical evidence that commonly used metrics, such as GDP and HDI, do not capture critical social, economic and environmental trends, increasingly relevant to human well-being (both in 4IR settings and in general)
  - Positive correlations between the TBL and happiness, however, were notable in some countries, albeit with a lag time between them, but not always
  - Correlations between TBL performance scores assessed here and GDP and HDI were low and insignificant
- Our research shows that major technological transformations do not necessarily equate to improvements in social, economic and environmental capitals
- Factors such as scale of implementation, social and economic context and starting conditions will influence the impact technological changes can make across society



# Conclusions (2/2)

- This work has demonstrated empirically the value of multi-capital measurement for the 4IR & well-being in general as a supplement to GDP and other common indices such as HDI
- Case study application of the model shows that measures such as GDP and HDI do not track performance in many of the impacts that will become increasingly important to monitor and evaluate in the 4IR & 21<sup>st</sup>-century economies in general
- The analysis has identified 10 areas material to the 4IR and Sustainability Norms for each, including Areas of Impact for which there is no sufficient data and where future survey efforts, therefore, should focus (i.e., privacy, inequality)
- The measurement model proposed here can be refined and built upon as more data become available
- Future applications of this work can include specific places (i.e., municipalities) with local stakeholders and testing of policy impacts on social, economic & environmental capitals





# Thank you!

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<https://www.sustainableorganizations.org/Introducing-ACS.pdf>

