AI FOR SUSTAINABILITY

ESG RATINGS

INDUSTRY BREAKFAST SEMINAR - APRIL 25TH, 2023

RICKARD SANDBERG

HOUSE OF INNOVATION & CENTER FOR DATA ANALYTICS (CDA)

STOCKHOLM SCHOOL OF ECONOMICS

Agenda

- ESG Ratings and Root Cause Problems
- ESG Ratings from an Investment, Management and Value Perspective
- Measuring ESG from a Stakeholder Perspective
- The Link between ESG Ratings and Financial Performance
- How can Data and AI help Improve ESG Measurements?
- Ways Forward
- AI for Sustainability – a Large Scope Project. CDA fundraising

ESG Ratings

- The value of AUM with an explicit ESG mandate amounted to $41 trillion last year (and $35.3 trillion 2020) - an increase by 78% since 2016

- In Europe? SRI €17.7 trillion (2019), and €1.6 trillion with an explicit ESG mandate

- *Investors perspective:* ESG ratings serve as an information basis for investment decisions. A major challenge is the lack of coherence among different ESG ratings - which one to trust? This causes great confusion for investors, and the likelihood of misplaced investments is tangible; creating barriers to greater adoption to ESG investing

ESG Ratings

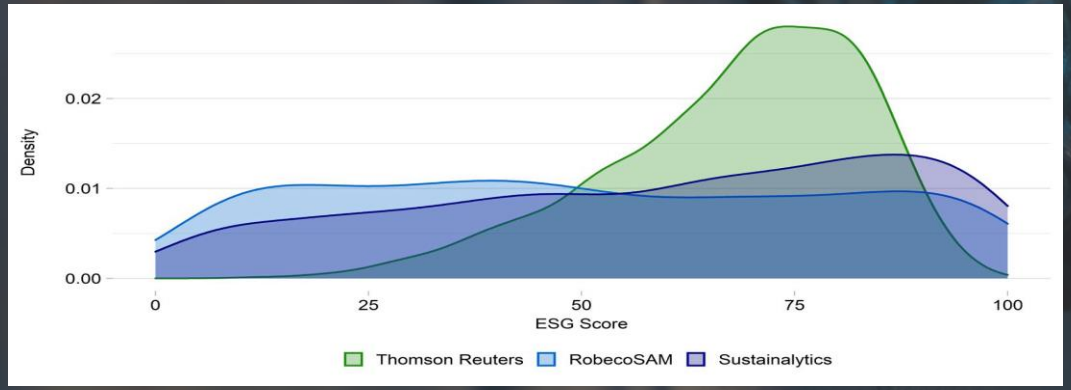
- *Management perspective:* the ESG ratings ambiguity leaves business managers unable to craft the right response to the different ratings - are the ratings a consequence of poor performance or poor measurement? Mixed signals hamper the ambition of companies to improve their ESG performance

- *Value relevance perspective:* The differences among companies' ESG ratings also create difficulties in tracking the impact that ESG factors have on returns, cost of capital, future cash-flows, etc. ESG performance is less likely to be reflected in corporate stock and bond prices, as investors face a challenge when trying to identify outperformers and laggards

ESG Ratings Root Cause Problems

- Low correlations among rating agencies. Average correlations between ESG ratings for the 6 rating agencies: KLD, Sustainalytics, Vigeo Eiris, RobecoSAM, Asset4 and MSCI are 0.54, and range from 0.38 to 0.71

- ESG score distributions (source: Bloomberg and Refinitiv Eikon)

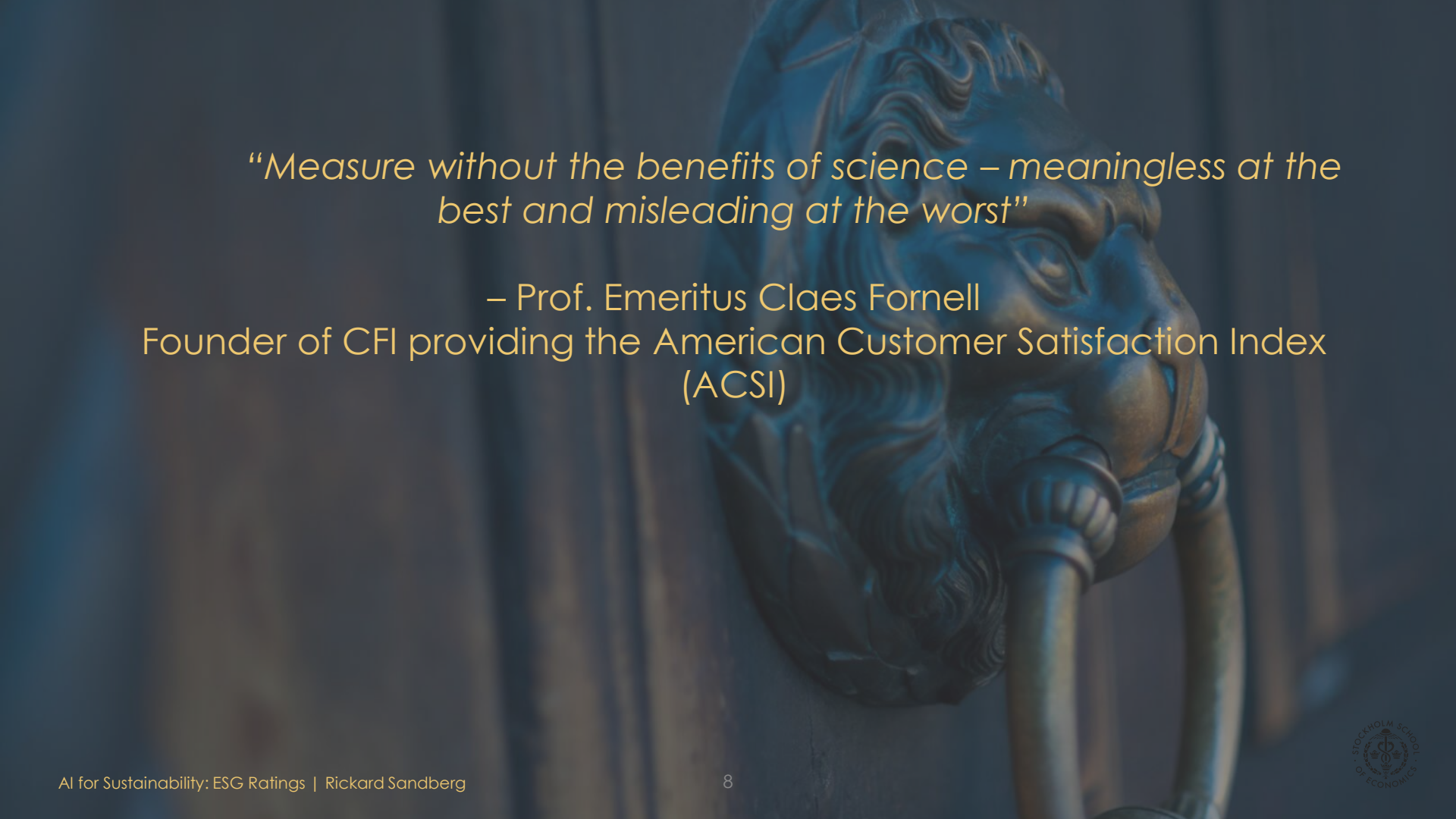


ESG Ratings Root Cause Problems

- Why the differences?
  - Scope divergence - situation where ratings are based on different sets of attributes. The aforementioned agencies: 709 indicators, 64 categories – only 10 of them in common
  - Measurement divergence - measure the same attribute using different indicators
  - Weight divergence - different views on the relative importance of attributes. Also, are the E, S and G factors equally important creating an overall ESG rating/Score?

Measuring ESG from a Stakeholder Perspective

- SASB has developed ESG metrics to allow consistent and comparable disclosure across companies. Materiality map
- Norms for financial performance measures: relevance, reliability and comparability
- ESG Measurements 1.0 - we question the role of ESG rankings as instruments for managing sustainability improvements
- We do so because of lack of stakeholder focus when identifying what is important to prioritize to achieve sustainability improvements
- We coin the term Accountable Sustainability Measurement (ASM)

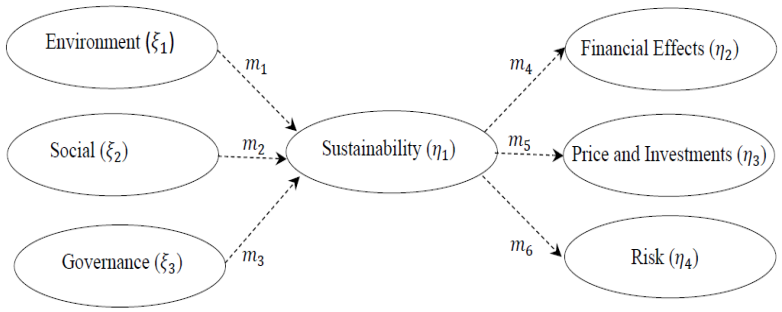


"Measure without the benefits of science – meaningless at the best and misleading at the worst"

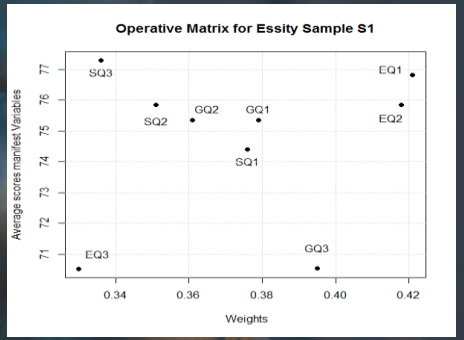
– Prof. Emeritus Claes Fornell
Founder of CFI providing the American Customer Satisfaction Index (ACSI)

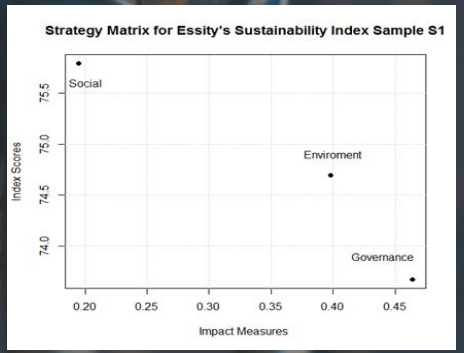
Example Research - Multilayer Predictive Modelling (MLPM)

Figure 1: *A prototype 3-layer predictive model*



Notes: Arrows signify impact measures (m) and the direction of causality. In an estimated model, all impact measures (m) are quantified and yield direct control over the causality chain: $(\xi_1, \xi_2, \xi_3) \rightarrow \eta_1 \rightarrow (\eta_2, \eta_3, \eta_4)$, or in other words, stating the (quantitative) effects Environment, Social and Governance have on companies Sustainability, and in turn stating which (quantitative) effects Sustainability has on dimensions such as Financial Effects, Price and Investments and Risk.





Summary of the research ESG Measurements 1.0:

- Stakeholder perspective - investor survey data. ASM. MLPM. Causality. Impact measures
- Best in class- and laggards' analysis. Scalable to industry and national levels
- Comparisons to ACSI (and Nöjd Kund Index, NKI)
- Actionability – operations and strategy
- What is next? ESG Measurements 2.0

ESG Ratings and Financial Performance

- Investing for good causes and impact investing but returns matters. Finding alpha (excess returns). What about beta (systematic risk)?
- Lack of rigorous, consistent, and reliable metrics makes it difficult to measure ESG effectiveness and its impact on performance
- True effects. Confused effects. No effects. Momentum effects. Long-lasting effects
- Survey on 1000+ studies from 2015-2020 found encouraging relationship between ESG and Financial Performance (in 58% of the studies)
- Bloomberg: ESG funds 6.3% return last five years, and broad funds 8.9% return

How can Data and AI help?

- Company disclosures not always that informative (and can be biased; lip-service and just cosmetics not creating long-term value)
- In the absence of a structured framework to report and monitor firms' ESG efforts (*), the burden lies on companies to communicate on their initiatives and on investors to research them
- Internal data + large amounts of external data (various data sources) ➡ ESG data bases from which critical ESG information can be extracted
- Automatic data collection. Sifting through and summarizing large amount of company data and other relevant macro data
- As always, quality of the data is everything; garbage-in, garbage out

How can Data and AI help?

- By advanced analytics (AI, say, but also by traditional methods) we can provide more accurate, efficient, and comprehensive data analysis

- Using NLP algorithms to scan large volumes of textual data, such as news articles, social media posts, etc.

- Using ML algorithms to:
  - Identify patterns/correlations between ESG factors and financial performance
  - Forecast earnings and cash-flow taking ESG materiality into account
  - Create backward- and forward-looking ESG measures (ESG predictions, Risk management,…)
  - To provide real-time monitoring and reporting of ESG-related data, enabling companies to quickly identify and address potential sustainability risks and opportunities. ESG dash-boards

Ways Forward

- What a good topic for discussions…
- Further regulations (SFDR, 2020; EU CSRD proposed 2021, ESRS, PRI, PA 2051, etc.). Self-regulations. Improved disclosures and ESG reporting, Transparency. Competitive advantages
- As an investor – build in house competencies to accompany agencies ESG ratings
- As a company – are there ways to assess your own ESG performance through the lens of stakeholders?

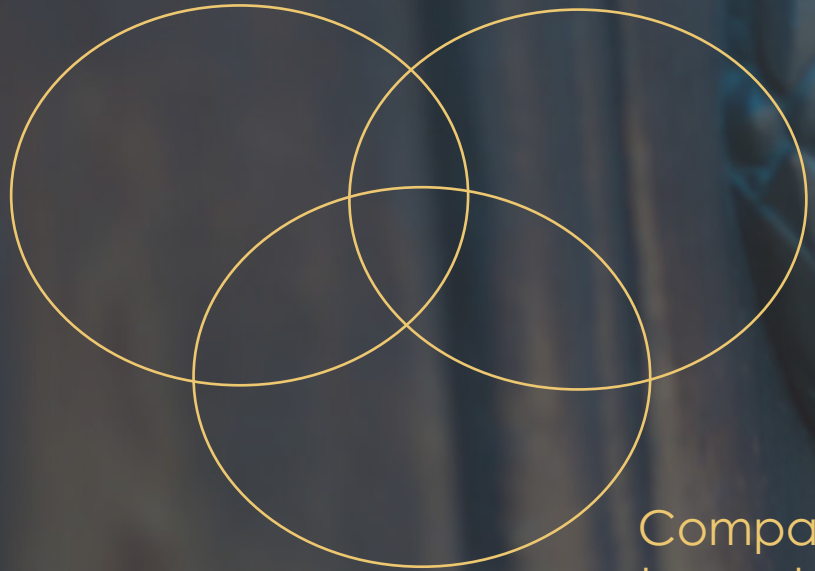
AI for Sustainability – a Large Scope Project

- ESG Measurements 1.0 - *"On Accountable Measurement of Corporate Sustainability; the Need for a Sustainability Index," by* Anders Westlund, Emma Sjöström and Rickard Sandberg. Founded by Nasdaq Nordic
- Soundboard: Robert G. Eccles (SASB), Ossian Ekdahl (AP1), Marja Carlsson (SEB), among others
- CDA is in a fundraising process looking for partners to work with AI for Sustainability

AI for Sustainability – a Large Scope Project

ESG Measurements 2.0

ESG Investing/Finance



+ Business Analytics
+ Predictive Analytics
+ Forecasting
+ Responsible-AI

Company (supply chain)Actions towards Net-zero Emissions

AI for Sustainability – a Large Scope Project

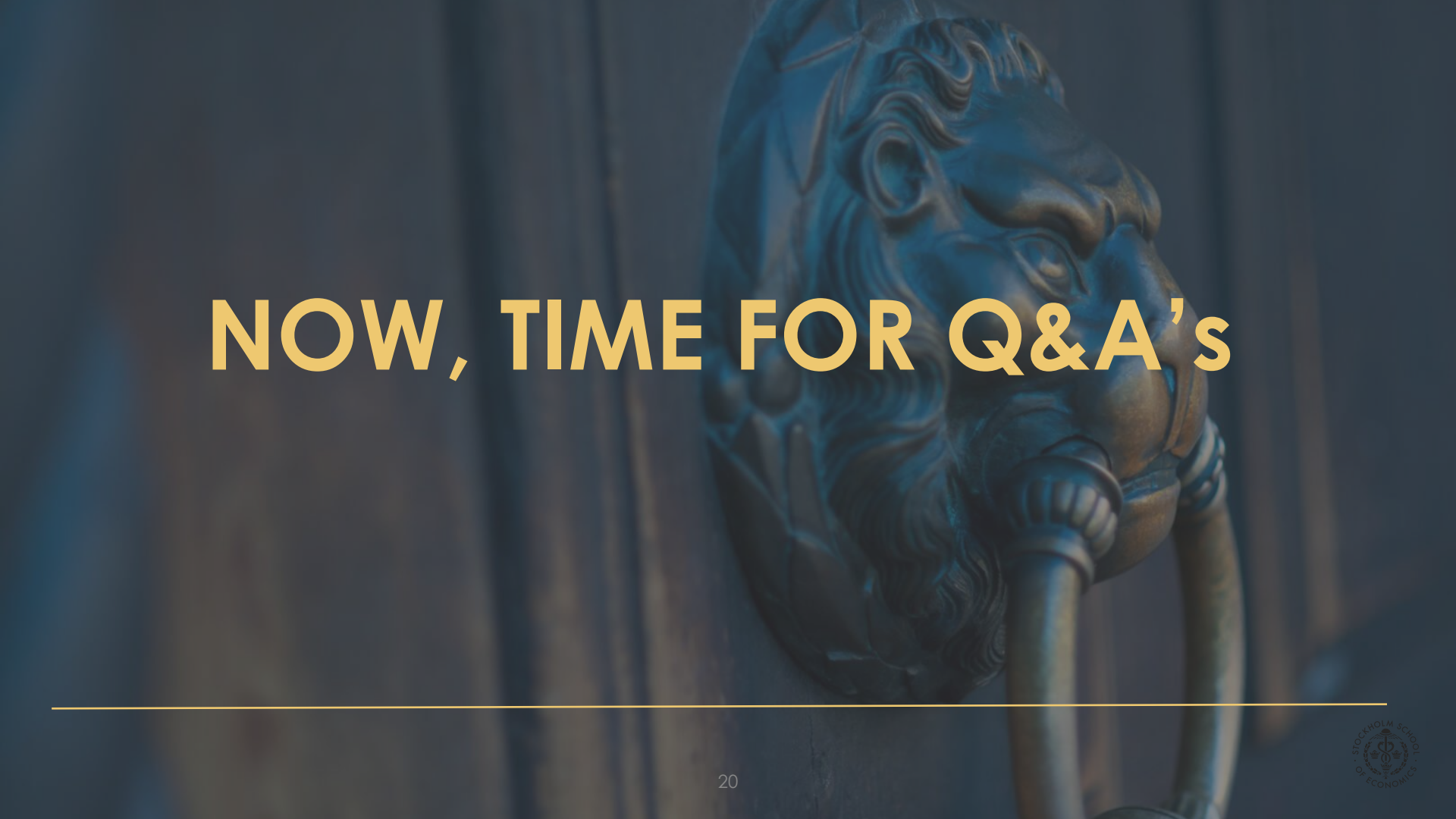
- A great opportunity for a company to be associated with this type of research and to collaborate to advance research
- *"Through scientific research and education strengthen Swedish competitiveness"* - SSE's mission since 1909
- 4 x Win: People – Profit – Planet – Practical Research/Publications

Inspiring initiatives:

- Harvard University - Harvard Kennedy School's Corporate Responsibility Initiative (CRI)
- Massachusetts Institute of Technology (MIT) - MIT Sloan School of Management's Sustainability Initiative
- University of Cambridge - Cambridge Institute for Sustainability Leadership (CISL)
- Yale University - Yale Center for Business and the Environment (CBEY)
- New York University (NYU) - NYU Stern Center for Sustainable Business
- University of Zurich - Center for Sustainable Finance and Private Wealth (CSP)

THANK YOU FOR YOUR ATTENTION

rickard.sandberg@hhs.se



NOW, TIME FOR Q&A's