Treatment of Ecosystem Services on Corporate Balance Sheets

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TUESDAY, OCTOBER 27, 2020 1:10 – 2:10 PM

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ENVIRONMENTAL EXTERNALITIES

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Externalities

- When firms decide how much to produce, or consumers how much to consume, they respond to "prices."
- Externalities – e.g. pollution – are negative byproducts of production or consumption that are not reflected in the market price.
  - They are also termed "third-party effects."
- Goods – clean air, clean water – that are underpriced tend to be overused.

Policy Implications

- If air and water are "free goods", then firms will overuse them.
  - They will continue to pollute up to the point that the marginal product of pollution approaches zero.
- If we "price" environmental goods properly (e.g., through pollution taxes or permits) then we can create incentives for optimal use.

Valuation of Environmental Externalities

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Valuation of Environmental Externalities

The first step in internalizing environmental externalities is to determine their value in monetary terms.

The monetary cost of externalities should be absorbed by the party responsible for the environmental damages.

THIS IS OFTEN REFERRED TO AS THE POLLUTER PAYS PRINCIPLE

Valuation Methods

Direct Valuation Methods

Indirect Valuation Methods

Indirect Valuation Methods

Indirect valuations are based on prices observed in real markets.

Several methods analyze, modify, project, transfer and extrapolate market prices in order to give externalities a monetary value.

Travel cost, hedonic prices, and so on, all work within this context.

Direct Valuation Methods

- Direct valuations of environmental externalities are based on stated preferences expressed in hypothetical markets.
- Contingent valuation and choice modeling studies ask the individual to value environmental impacts and environmental externalities.

Environmental Impacts Across Time and Space

Valuation of individual ecosystems are limited in both time and space:

- Some environmental impacts (climate change, storage of nuclear waste) are extremely long-lived.
- Valuation of individual systems tend to be limited by the human lifetime.
- In some cases, a premium inspired by concern for direct descendants.
- Individual valuations are similarly confined by the spatial range within which the individual acts and perceives. … Altruistic considerations can exist only at a limited level which cannot seriously alter aggregate estimates.

Is the internalization of environmental externalities relevant to sustainability?

- Environmental externalities affect the welfare of individuals who belong to three main categories:
  1. Individuals who belong to the same institutional setting as those who created the externality. Sufferers and perpetrators are actors within the same economic system.
  2. Individuals of future generations.
  3. Individuals located spatially outside the institutional system of those creating the externality

Competition Among Generations

The competition among generations for non-renewable resources establishes a peculiar externality since the current generation is the only one present when the relevant decisions are taken.

- Although, this externality cannot be eliminated, probably it can be moderated through the recognition of some property rights for the generations to come.

Solving Intergenerational Externalities

The preservation of environmental functions, services and infrastructure is the solution to intergenerational environmental externality.

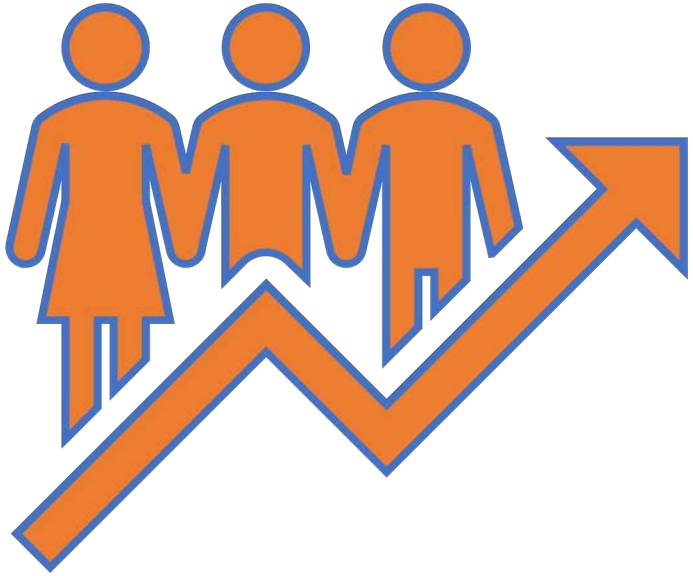
- This should be designed in environmental terms which cannot be expressed through economic valuations.
- By setting targets in biological–ecological terms, the environmental rights of future generations are preserved and externalities detrimental to sustainability are avoided.

Addressing Intergenerational Externalities

Economists' preference for market-based instruments should be reassessed in the light of the demand for sustainability and the preservation of environmental rights of future generations.

Intergenerational externalities can be remedied by:

- investment in manufactured capital (to replace non-renewable resources);
- bequeath resource-saving technology to future generations;
- choose an appropriate social discount rate for future utilities.



ECOSYSTEM SERVICE VALUATION

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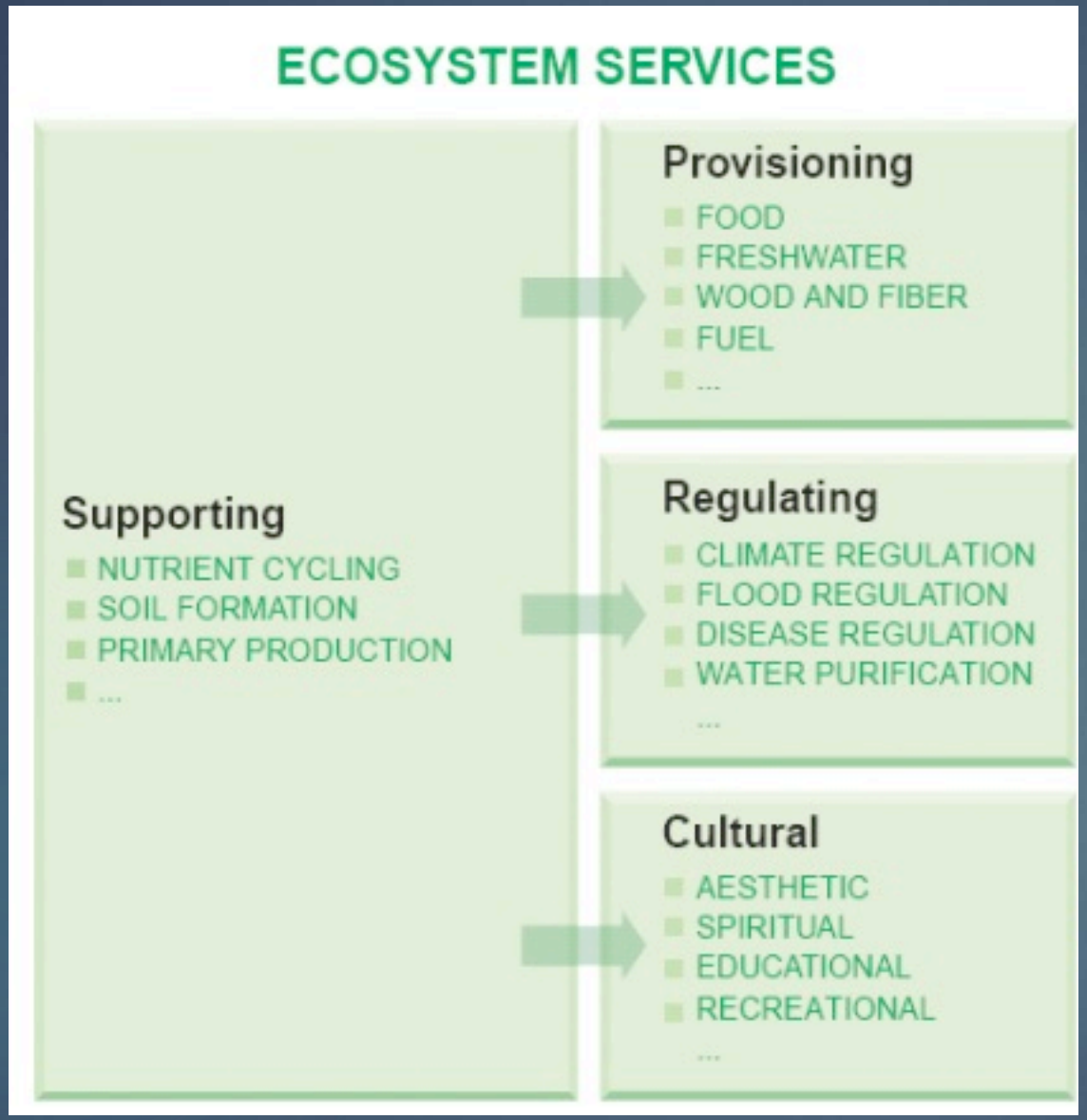

Millennium Ecosystem Assessment (MES) Ecosystems Services (ES) Categories

Supporting Services

Ecosystems functions that are the foundation for other functions'

- **Primary production:** the synthesis of organic compounds from atmospheric or aqueous carbon dioxide. It principally occurs through the process of photosynthesis, which uses light as its source of energy, but it also occurs through chemosynthesis, which uses the oxidation or reduction of inorganic chemical compounds as its source of energy.
- **Nutrient Cycling:** the movement and exchange of organic and inorganic matter back into the production of matter. Energy flow is a unidirectional and noncyclic pathway, whereas the movement of mineral nutrients is cyclic. Mineral cycles include the carbon cycle, sulfur cycle, nitrogen cycle, water cycle, phosphorus cycle, oxygen cycle, among others that continually recycle along with other mineral nutrients into productive ecological nutrition.
- **Soil Formation:** organic matter, minerals, gases, liquids, and organisms together supporting life. a combination of effects including **weathering**, structural development of the soil, differentiation of that structure into horizons or layers, and lastly of its movement or translocation. All of these functions, in their turn, modify the soil and its properties.

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Provisioning Services

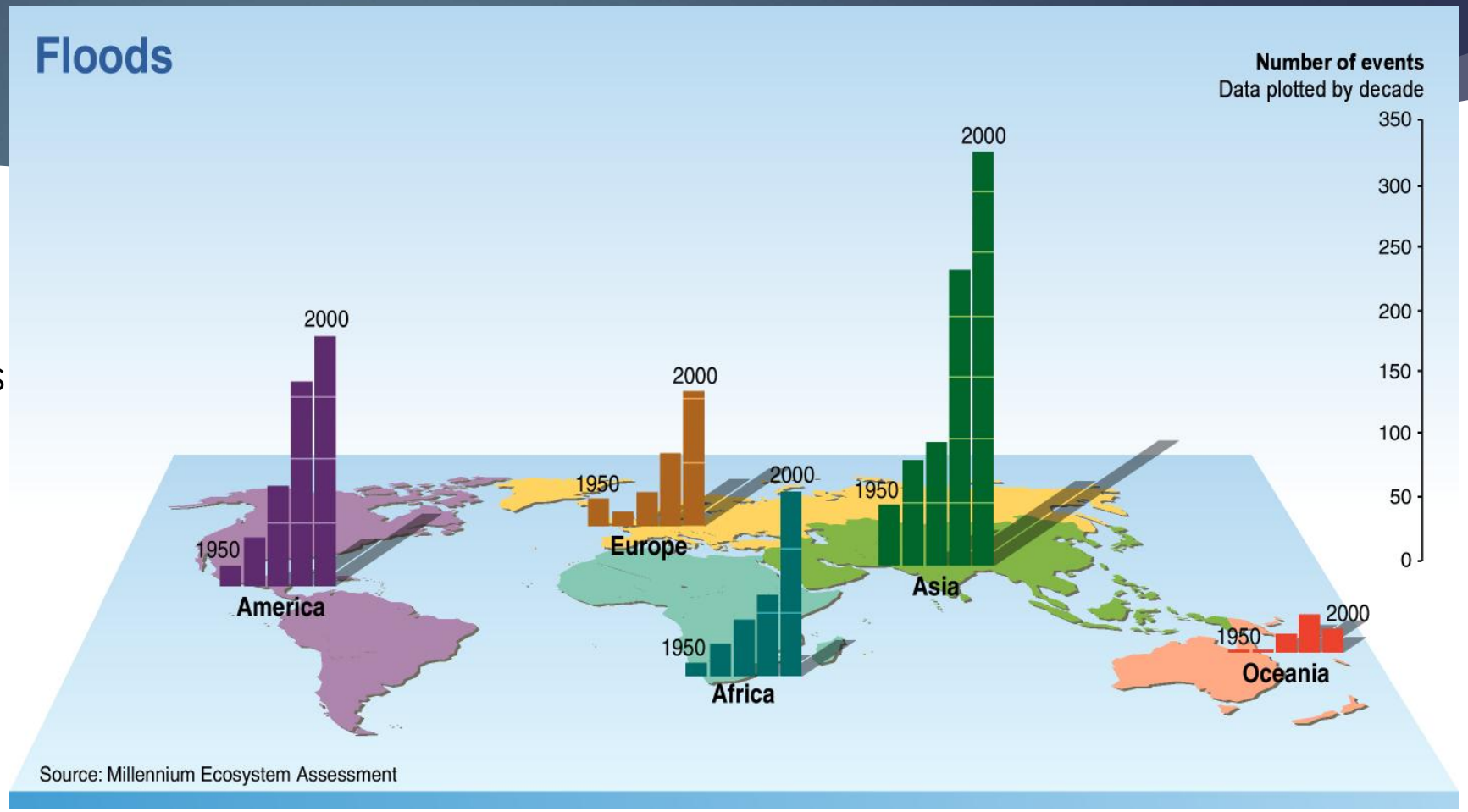
- Food
- Fresh water
- Wood and fiber
- Fuel

Regulating Services

- **Air quality regulation**
  - Ability of the atmosphere to cleanse itself of pollutants has declined since pre-industrial times but not by more than 10%
- **Regional and local climate regulation**
  - Changes in land cover have affected regional and local climates both positively and negatively, but there is a preponderance of negative impacts ; for example, tropical deforestation and desertification have tended to reduce local rainfall
- **Water purification and waste treatment**
  - Globally, water quality is declining, although in most industrial countries pathogen and organic pollution of surface waters has decreased over the last 20 years
  - Nitrate concentration has grown rapidly in the last 30 years
- **Pest regulation**
  - In many agricultural areas, pest control provided by natural enemies has been replaced by the use of pesticides – such pesticide use has itself degraded the capacity of agroecosystems to provide pest control
- **Pollination**
  - There is established but incomplete evidence of a global decline in the abundance of pollinators

Regulating Services

- Natural hazard regulation
  - The capacity of ecosystems to buffer from extreme events has been reduced through loss of wetlands, forests, mangroves
  - People increasingly occupying regions exposed to extreme events



Cultural Services

AESTHETIC

SPIRITUAL

RECREATIONAL

EDUCATIONAL

Measuring Sustainability

OPERATIONALIZING SUSTAINABILITY USING SUSTAINABILITY INDICATORS

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Ronald Coase on Technology, Institutions & Payments for Ecosystems Services (PES)

- Coase has been credited as the father of current PES frameworks.
- "Institutions have more impact on the "productivity" of societies than the technologies available to them !"

The narrow definition of PES as a voluntary transaction negotiated among private contractors has been revised

New broader schemes characterized by the intermediation of the Government between those who benefit and those who preserve the ecosystems' functioning.

This broader definition includes direct payments by public authorities to private land-owners to maintain or enhance the forest cover, (UNDP –Financing Solutions for Sustainable Development)

Payments for Ecosystems Services Cont'd

examples

The payments to landowners may be financed either

- 1. Directly by the payments of (private) beneficiaries,
  - for example by Nestle (formerly Vittel) to stop farmers using chemicals in northeastern France or
  - by the City of New York to protect watersheds in the Catskill mountains; or
- 2. Indirectly by the intermediation of the public authority which—on behalf of the wider public—disburses the compensation for conservation
  - as in the China's Conversion of Cropland to Forest and Grassland Programme or
  - As in the Costa Rica's Environmental Services Payment Programme.
- To fund these expenditures, countries can either
  - access the general budget
  - or introduce PES like taxation with special purpose taxes and fees, targeting the tourism, water, electricity, transport and extractive sectors,(mining, petroleum and timber sectors, as the implied beneficiaries.
    - Costa Rica financed its programme with the resources generated from gasoline taxes.
    - In Vietnam prices are regulated for hydropower generators (20 VND/KWH), clean water suppliers (20 VND/m3), tourism
    - (UNDP –Financing Solutions for Sustainable Development)

SUSTAINABILITY – WHAT ARE WE MEASURING

Public Policy

- Meeting our society's needs in ways that don't compromise the ability of future generations to meet theirs."
- "At its core, sustainability is about being responsible with resources – people, land, energy, water, materials and capital."
  Clark S. Davis, Vice Chairman – HOK, "A Green Convergence: Linking Environmental and Organizational Sustainability," Horizons, RubinBrown, Spring 2009.
- The word sustainability is all too often confused with simple survival in challenging economic conditions …"

Sustainability Indicators for the Private Sector

Where are the Payments for Ecosystems Services Buried ?

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SUSTAINABILITY – WHAT ARE WE MEASURING

BUSINESS MODELS

"Now is the time for the forward-thinking organization to assess the market, look at competitors and evaluate its long-term plan."

"Keys to sustainability are customer satisfaction and satisfaction of your personnel."

John F. Herber, Jr., Horizons, RubinBrown, Spring 2009.

ACCOUNTING FOR SUSTAINABILITY

DEFINITIONS

Sustain
To give support to
Support the weight of
Keep up or prolong
To bear up under

Sustaining
Aiding in the support of an organization through a special fee (sustaining member)

Sustained yield
Production of a biological resource under management procedures which insure replacement of the part harvested by regrowth or reproduction (ca. 1905)

John Keithley PhD, Saint Louis University

Private Sector Sustainability Tools: Corporate Sustainability Programs & Reporting

Corporate Sustainability Programs

Sustainability must be Integrated into Strategic Planning & Management

Sustainability Must be Built into:

- Economic/financial planning
- Environmental planning
- Social performance (labor rights)
  - Compensation and benefits
  - Diversity
- Human rights
- Products & services
- Product responsibility
- Society (overall impact)

John Keithley PhD, Saint Louis University

DRIVERS OF CORPORATE SUSTAINABILITY

Economic considerations	74%
Ethical considerations	53%
Innovation and learning	53%
Employee motivation	47%
Risk management/reduction	47%
Access to capital/shareholder value	39%
Reputation or brand	27%
Market position/share	21%
Supplier relationships	13%
Cost savings	9%
Improved government relations	9%

John Keithley PhD, Saint Louis University

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CORPORATE SUSTAINABILITY STAKEHOLDERS: U.S. PUBLIC ORGANIZATIONS

Financial

- Shareholders (Institutions --- Individuals)
- Bond holders
- Banks
- Employees (including unions)
- Other capital sources (venture capitalists)

Supply chain

- Customers
- Alliance partners
- Direct suppliers
- Upstream suppliers
- Contractors

Regulatory

- SEC
- IRS
- OSHA
- FDA
- EPA
- Accounting standards (FASB, IASB, PCAOB)
- FCC

Political

- Federal gov't
- State & local gov't
- International gov't
- United Nations
- EU
- OPEC
- NATO

Social

- Local communities
- General public
- Academia
- Charitable organizations
- Environmental & social organizations

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John Keithley PhD, Saint Louis University

Corporate Sustainability Reporting (CSR) Methodology

Framework for CSR Sustainability Reporting Guidelines

John Keithley PhD, Saint Louis University

Framework Identifies:

- strategy and analysis
- organizational profile
- report parameters
- governance, commitments, and engagements

Management Approach & Performance Indicators

- Reporting on trends
- Use of protocols
- Presentation of data
- Data aggregation
- Metrics

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Corporate Sustainability Reporting

some examples

SASB issues first set of standards for healthcare sector issued

GRI issues G4 Guidelines

IIRC issues first

<IR> Framework

SUSTAINABILITY ACCOUNTING STANDARDS BOARD (SASB) GUIDANCE

JOHN PAUL, PHD ESQ., CPA, DEPARTMENT OF ACCOUNTING, BROOKLYN COLLEGE

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SASB – Sustainable Accounting Standards Board

- SASB has developed a complete set of 77 industry standards. In November 2018, SASB published these standards, providing a complete set of globally applicable industry-specific standards which identify the minimal set of financially material sustainability topics and their associated metrics for the typical company in an industry

- SASB staff and Standards Board followed a Conceptual Framework and Rules of Procedure to develop these standards, which are designed to be cost-effective for companies to implement and decision-useful to both companies and investors.

- These standards are explained graphically through the Materiality Map, are available for individual sector download and may be viewed through the complete Standards Navigator database.

https://www.sasb.org/standards-overview/

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Corporate Sustainability Reporting

where are we now ?

The *UN Global Compact-Accenture CEO study on Sustainability 2013* shows that CEO's recognize the sustainability challenge, but grapple with measuring and valuing their activities

Situation

Sustainability is perceived to be very important by CEO´s:

- 93% believe that sustainability will be important to the future success of their business.
- 80% view sustainability as a route to competitive advantage in their industry.

Complication

However CEO´s find sustainability difficult to implement and quantify:

- 38% believe they can accurately quantify the value of their sustainability efforts.
- 37% see the lack of a link to business value as a barrier to accelerating progress.

OECD BETTER POLICIES FOR BETTER LIVES

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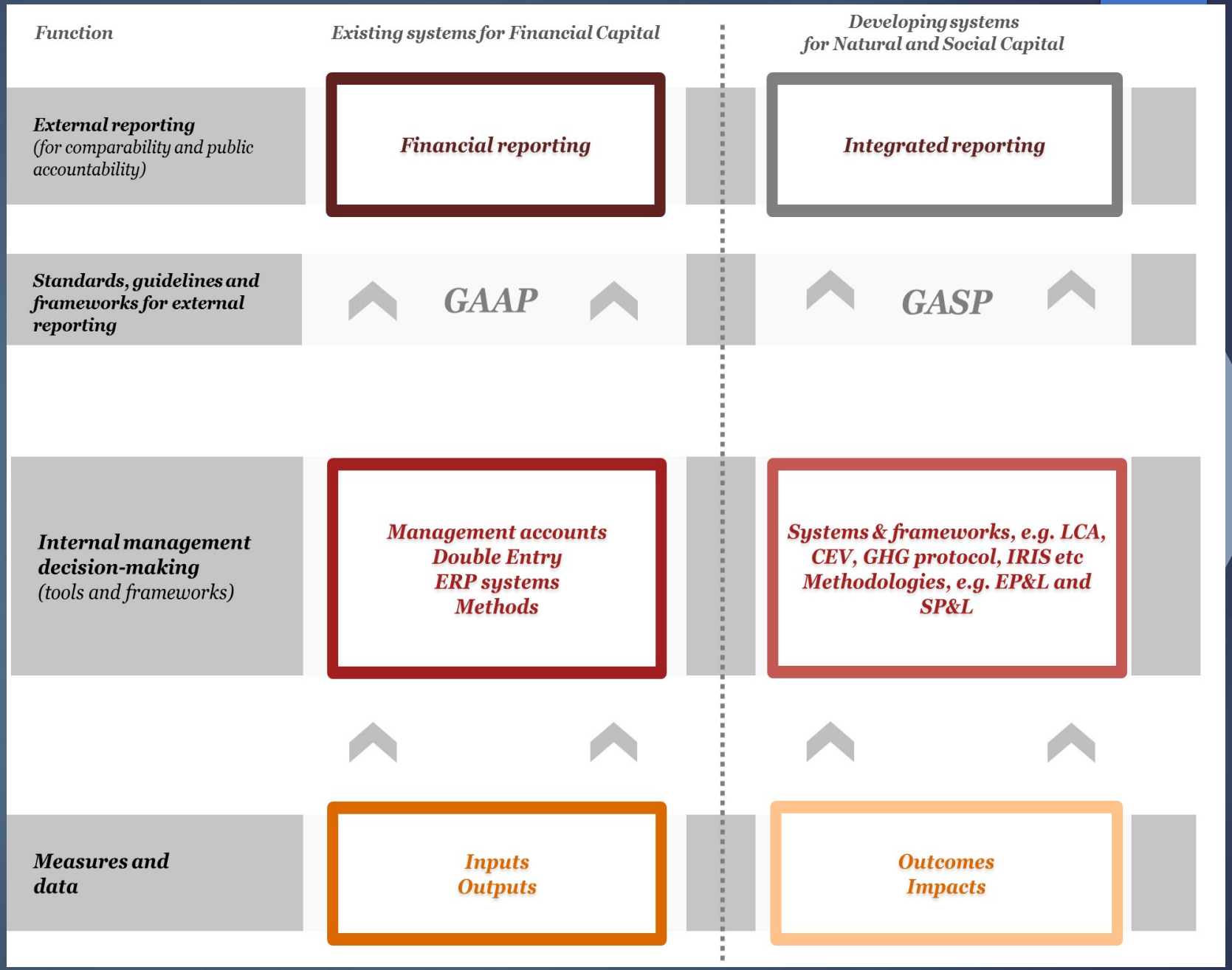
Corporate Sustainability Reporting

Where are we going ?
Create systems to capture payments for natural and social capital

Identify & Track Payments for Ecosystems Services (PES)



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Corporate Sustainability

- Corporate sustainability is defined as the contribution of business firms to sustainable development (Bansal 2005; Dyllick and Hockerts 2002).
- Conventional business firms predominantly follow a market logic that focuses on generating profit. In contrast, sustainable business models follow a comprehensive sustainability logic that integrates economic, ecological and social considerations with regard to present and future generations.
- How business firms deal with sustainable development challenges depends on the information that is available for decision-making and how actual decisions are taken.
- Accounting constructs the reality that management refers to (Hines 1988) as well as how stakeholders perceive and organization (O'Dwyer 2005).

Market Logic and Corporate Sustainability

- The dominance of market logic turns ecological and social performance into a means for the attainment of the objective of financial performance (Schneider 2015).

- Corporate sustainability is regarded by some as just another opportunity to advance economic objectives (Laine 2010).

- **In order for business firms to embrace sustainability logic, there must be incentives based on market logic.**

Implementation of Sustainability Reporting in Turkey

- The concept of sustainability reporting and corporate social responsibility emerged in Turkey in the late 1990s and early 2000s with the increasing integration of Turkish companies with the international economy (Akdogan et al. 2020)
- Turkish companies started to initiate environmental protection, promotion of social welfare and justice to gain competitive advantages in the global arena.
- **Yet, compared to two of its neighbors, Turkey lags in the number of companies preparing sustainability reports – Russia 35%, Greece 27%, Turkey 11%.**

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Differences between Turkey, Russia & Greece

- Why do Russian & Greek companies do more sustainability reporting than Turkish companies?

- The Russian economy is dominated by the energy sector so Corporate Social Responsibility (CSR) focus on energy saving & environmental protection.

- Greek companies invest in environmental projects largely because of European Union regulations.

- Turkish companies invest in educational facilities and supporting women and disabled people in society.

First-Ever Industry-Specific Standards Issued for SASB

- SASB has issued 77 industry-specific standards designed to help business identify, manage and communicate financially material sustainability information to investors.
- SASB is one of several groups that the Center for Safety and Health Sustainability has engaged with as part of its efforts to endure that human capital metrics are incorporated into sustainability practices.
- SASB industry standards address 26 business issues related to the environment, social capital, human capital, business model and innovation as well as leadership and governance.

Accounting Metrics: Agricultural Products – Operational Energy

- 1 The entity shall disclose (1) the total amount of energy it consumed (excluding fleet vehicles) as an aggregate figure, in gigajoules (GJ).
- 1.1 The scope of energy consumption excludes fuel consumed by fleet vehicles, but includes energy from all other sources, including energy purchased from sources external to the entity and energy produced by the entity itself (self-generated). For example, purchased electricity, and heating, cooling, and steam energy are all included within the scope of energy consumption.
- 1.2 The scope of energy consumption includes only energy directly consumed by the entity during the reporting period.
- 1.3 In calculating energy consumption from fuels and biofuels, the entity shall use higher heating values (HHV), also known as gross calorific values (GCV), which are directly measured or taken from the Intergovernmental Panel on Climate Change (IPCC), the U.S. Department of Energy (DOE), or the U.S. Energy Information Administration (EIA).

Accounting Metrics: Agricultural Products - Electricity

2 The entity shall disclose (2) the percentage of energy it consumed (excluding fleet vehicles) that was supplied from grid electricity.

2.1 The percentage shall be calculated as purchased grid electricity consumption divided by total energy consumption.

Accounting Metrics: Agricultural Products – Renewable Energy

- 3 The entity shall disclose (3) the percentage of energy it consumed (excluding fleet vehicles) that is renewable energy.
- 3.1 Renewable energy is defined as energy from sources that are replenished at a rate greater than or equal to their rate of depletion, such as geothermal, wind, solar, hydro, and biomass.
- 3.2 The percentage shall be calculated as renewable energy consumption divided by total energy consumption.
- 3.3 The scope of renewable energy includes renewable fuel the entity consumed, renewable energy the entity directly produced, and renewable energy the entity purchased, if purchased through a renewable power purchase agreement (PPA) that explicitly includes renewable energy certificates (RECs) or Guarantees of Origin (GOs), a Green e Energy Certified utility or supplier program, or other green power products that explicitly - include RECs or GOs, or for which Green e Energy Certified RECs are paired with grid electricity. -
- 3.3.1 For any renewable electricity generated on-site, any RECs and GOs must be retained (i.e., not sold) and retired or cancelled on behalf of the entity in order for the entity to claim them as renewable energy.
- 3.3.2 For renewable PPAs and green power products, the agreement must explicitly include and convey that RECs and GOs be retained or replaced and retired or cancelled on behalf of the entity in order for the entity to claim them as renewable energy.
- 3.3.3 The renewable portion of the electricity grid mix that is outside of the control or influence of the entity is excluded from the scope of renewable energy

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Kellogg's Sustainability Accounting Standards Board (SASB) Disclosure June 2020

http://crreport.kelloggcompany.com/cr-report

Hershey's Sustainability Accounting Standards Board (SASB) Disclosure 2019

- https://www.thehersheycompany.com/content/dam/corporate-us/documents/pdf/hershey_SASB_2019.pdf

Payment for Ecosystem Services

- This study is an extension of Prof. Hildegaard Link's dissertation work on Payments for Ecosystem Services in electric and water utilities.
  - Both of these types of entities are quasi-public organizations and subject to Public Utilities Commissions' or similar bodies' oversight, as such their financial records are public.
  - It was not difficult to find expenses that could be categorized as payments for ecosystems services in the Public Utilities reporting guidelines.
- We looked at the sustainability reporting systems of both Kellogg's and Hershey's. It was difficult to identify anything that looks like PES.

SASB Standards Implementation: Promises Not Kept

- The goal of this study has been to identify Payments for Ecosystem Services buried in corporate financial reporting.
- In reviewing CSR and SASB standards and sustainability reporting of two corporations, we identified the following barriers to imputing PES values.
  - Corporate sustainability reporting is not mandated, and hence the information reported is driven by the needs of each corporation rather than a common set of values
  - While corporation expenses include payments for ecosystem services, they are not readily identifiable from publicly available data.
  - As a result, we have not been able to present empirical results across companies.

Directions for Future Research

- This study raises more questions than it answers. We hope to extend this project in one or more of the following directions:
  - We will explore how regional variation on environmental, social and economic values affects sustainability reporting standards.
  - Payment for ecosystem services are specific to each region, industry and biome.
    - Payments for ecosystem services are paid by each corporation, independent of reporting requirements.
    - Reporting standards are sensitive to market logic.
    - Capturing payments for ecosystem services will enable us to sustainably manage our natural and human resources.

THANK YOU

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