


HARVARD | BUSINESS | SCHOOL

Societal and Environmental Applications of Activity-Based Costing and Balanced Scorecard

Sept 2021

Prague University of Economics and Business

Robert S. Kaplan, Senior Fellow and Marvin Bower Professor of Leadership Development

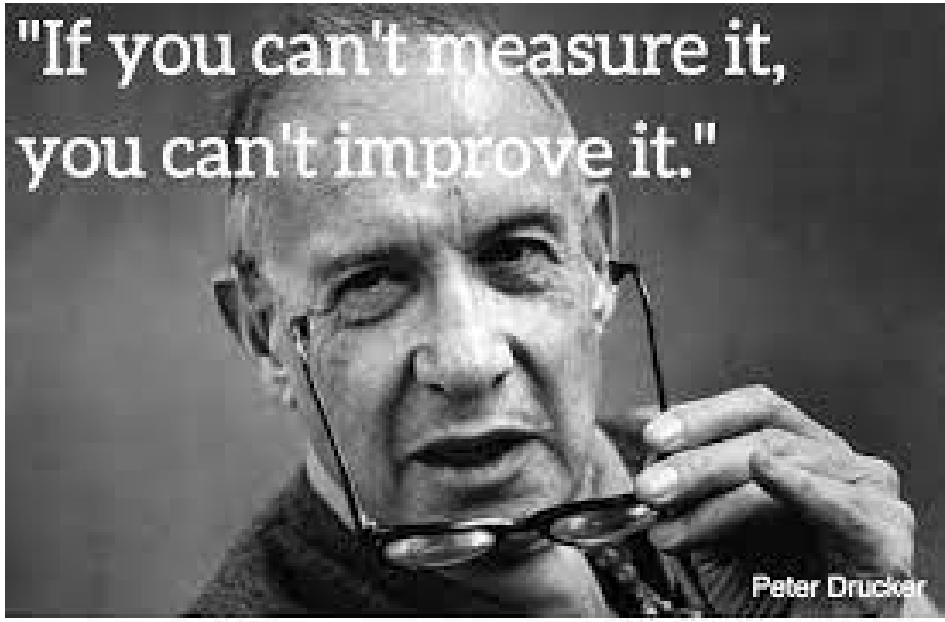
Accounting Matters

“When you can measure what you are speaking about and express it in numbers, you know something about it. When you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind.”

Lord Kelvin

“If you can’t measure it, you can’t manage it. If you can’t manage it, you can’t improve it.”

Peter Drucker



I have, in the past decade, applied two of my accounting/measurement innovations — Activity-Based Costing (ABC) and Balanced Scorecard (BSC) — to health care, climate change, and poverty.

1. Applying time-driven activity-based costing to healthcare
   a. Kaplan RS and Porter ME. “How to Solve the Cost Crisis in Healthcare.” *Harvard Business Review* (September 2011): 46-64.
   b. Kaplan RS. “Improving Value with TDABC.” *HFM [Healthcare Financial Management] Magazine* (June 2014).

2. Extending activity-based costing to measure a company’s greenhouse gas emissions.
   a. Kaplan RS and Ramanna K. “How to Fix ESG Reporting.” HBS Working Paper 22-005 (July 2021)
   b. Kaplan RS and Ramanna K. “Accounting for Climate Change.” *Harvard Business Review* (Nov-Dec 2021, to appear 17 October 2021).

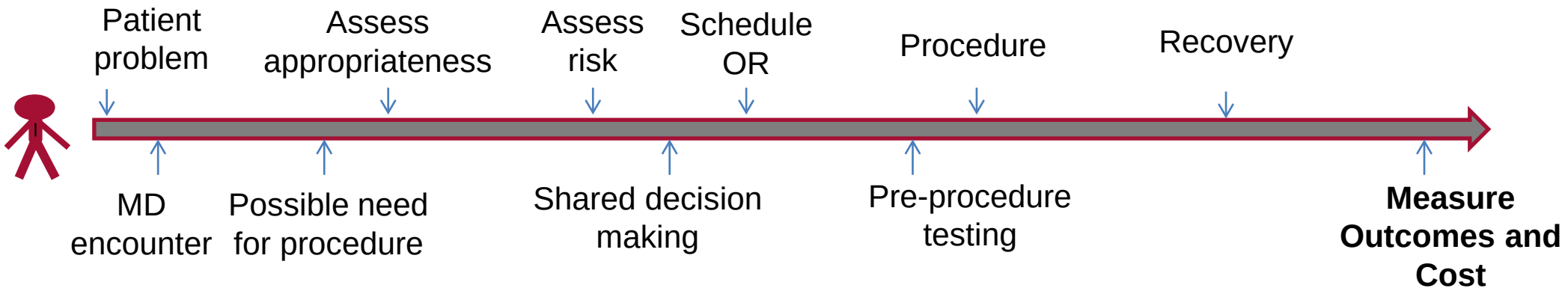
3. Updating the Balanced Scorecard to Reflect Corporate Environmental and Societal Performance
   a. Kaplan RS, Serafeim G, and Tugendhat E. “Inclusive Growth: Profitable Strategies for Tackling Poverty and Inequality.” *Harvard Business Review* 96(1) (January-February 2018): 126-133. https://hbr.org/2018/01/inclusive-growth-profitable-strategies-for-tackling-poverty-and-inequality
   b. Kaplan RS and McMillan D. "Reimagining the Balanced Scorecard for the ESG Era." *Harvard Business Review* Digital Articles (February 3, 2021).

1. What is Value-Based Health Care?

The central goal in health care must be **value for patients**, measured as:

$$\text{Value} = \frac{\text{Health outcomes that matter to patients}}{\text{Costs of delivering those outcomes}}$$

The unit of analysis for creating and measuring value is the treatment of a patient's **medical condition** over a complete **cycle of care**.



How to Overcome a Barrier to Implementing Value Based Health Care

Problem: Distorted measurement of **costs** at the patient level; confusion between charges and costs

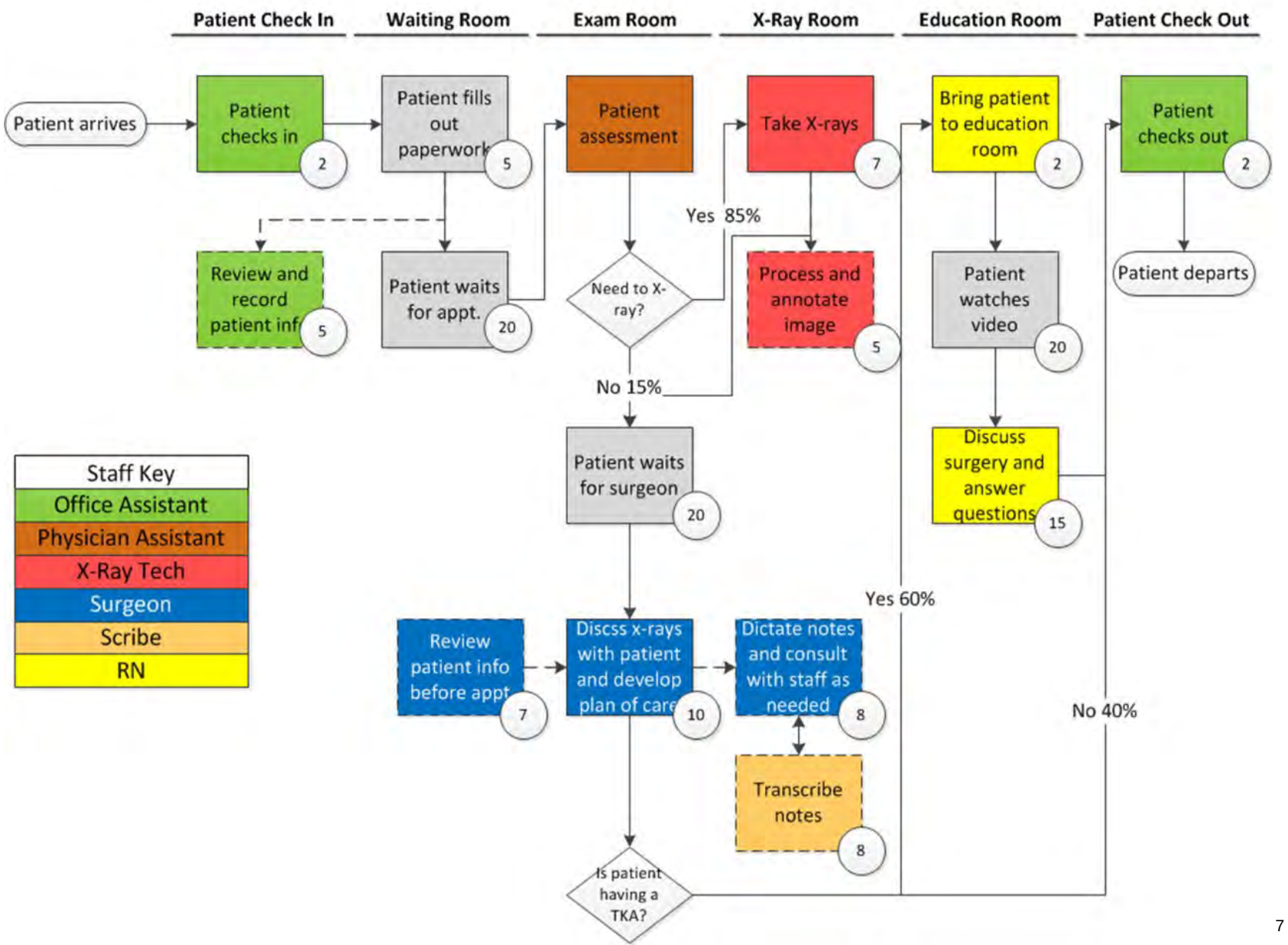
Solution: Use **Time-Driven Activity-Based Costing** (TDABC) to measure and improve **costs** across a medical condition's complete cycle of care

Time-Driven Activity-Based Costing (TDABC)

1	**Determine the Care Process**	• **What activities** are performed over the care cycle for a medical condition? • **Who performs** each activity? • **How long** does each activity take?
2	**Calculate Cost Rates**	• **What is the cost per unit of time** for each type of personnel and equipment?
3	**Account for Consumables**	• **What is the cost of devices, supplies, and drugs** consumed during the care cycle?

TDABC Step 1: Clinical and administrative teams work collaboratively to create process maps:

- Process-Steps: All the administrative and clinical process-steps used over a patient's complete cycle of care for a medical condition
- Resources: personnel, equipment, consumable medicines and supplies – used at each process step
- Time Estimates: The personnel and equipment time used at each process step for that patient



HAR

TDABC Step 2: Calculate the Capacity Cost Rates for each resource (personnel and equipment)

	Surgeon	Physician Assistant	RN	X-Ray Tech	Scribe	Office Assistant
Total Clinical Costs	**$546,400**	**$120,000**	**$100,000**	**$64,000**	**$51,000**	**$61,000**
Personnel Capacity (minutes)	91,086	89,086	89,086	89,086	89,086	89,086
Personnel Capacity Cost Rate	**$6.00**	**$1.35**	**$1.12**	**$0.72**	**$0.57**	**$0.68**

We compute total patient-level care costs by multiplying capacity cost rates of personnel and equipment by process times. Then sum across each patient's cycle of care

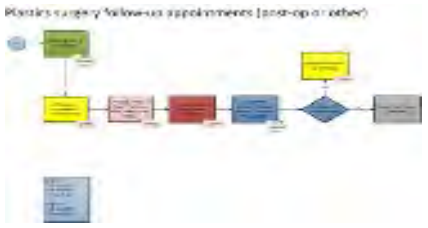
Initial consultation

Personnel Type	Minutes	Cost/ minute	Total
MD	X_1	Y_1	136.13
RN	X_2	Y_2	68.04
CA	X_3	Y_3	6.17
ASR	X_4	Y_4	15.74
			$266.08

Surgical procedure

MD	X_1	Y_1	584.99
Anesth.	X_2	Y_2	603.89
RN	X_3	Y_3	136.29
Tech	X_4	Y_4	97.82
OR	X_5	Y_5	329.16
			$1752.15

Follow-up or post-operative visit



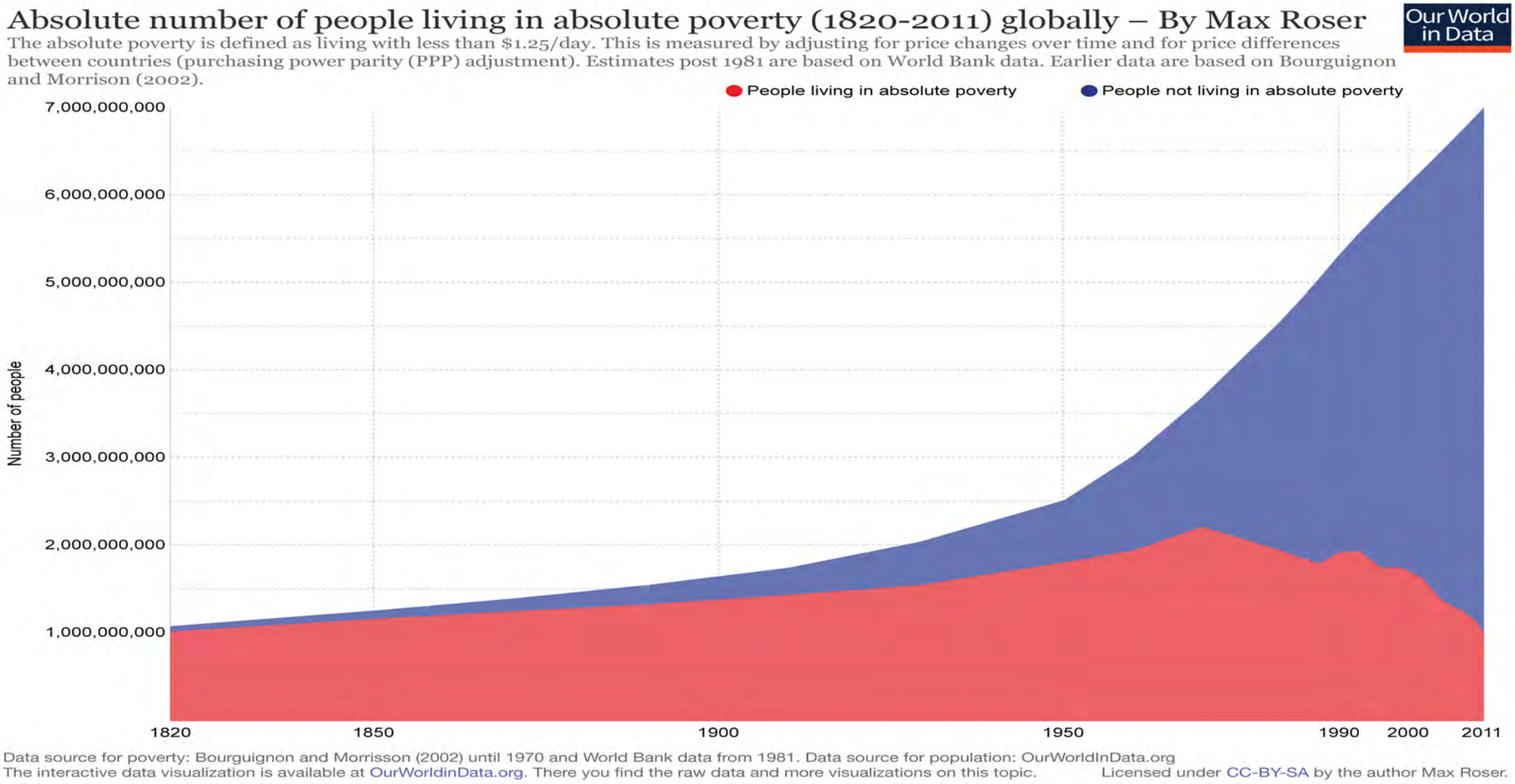
MD	X_1	Y_1	55.19
RN	X_2	Y_2	13.61
CA	X_3	Y_3	3.09
ASR	X_4	Y_4	1.77
			$73.66

How does TDABC help providers manage their costs

Process Improvement and Redesign

- **Eliminate** process steps and variations that **do not contribute to improved patient outcomes**
- **Benchmark** costs across similar sites treating the same medical condition; Learn from best practices.
- **Redesign** processes to **reduce inefficiencies, waste and idle time**
- **Optimize** processes and interventions over a **complete cycle of care**
- All **clinicians** work at the **“top-of-their-license”**

2. and 3. Market-based Global Capitalism, during the past two centuries, has created enormous wealth and lifted billions out of Poverty



But some of the enormous increase in humans' growth and wealth has required burning carbon fuels that have degraded the environment

And, despite enormous increases in income and wealth, many have been left behind.

Inequality undermines people's faith that market-based global growth benefits all

- Pervasive poverty at the "Bottom of Pyramid": Africa, Asia, Latin America
- Adverse trends in income and health in US among non-college educated individuals
- High unemployment, especially among youth
- Excessive CEO compensation

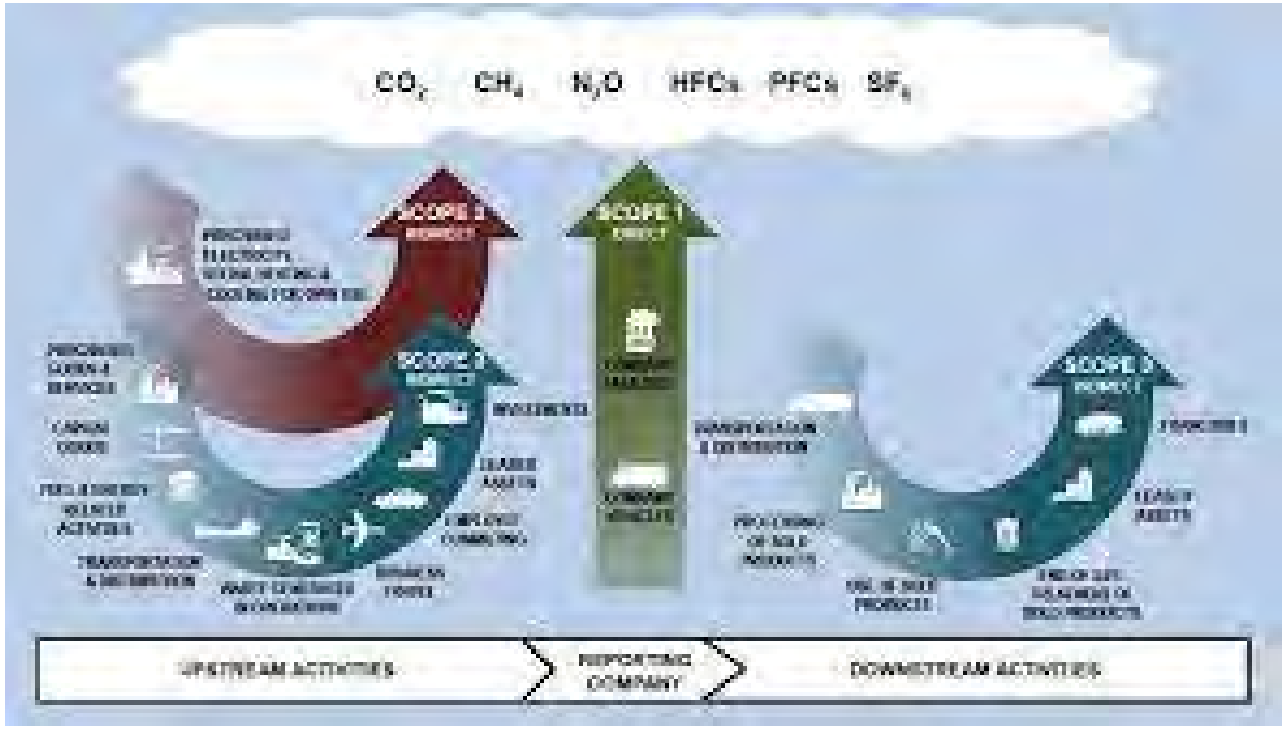
Measuring Corporate GreenHouse Gas (GHG) Emissions

A UN-sponsored working group published the GHG Protocol Standard in 2001.

Scope 1: Direct GHG emissions from sources owned or controlled by a company; e.g., production equipment and fleet of company vehicles.

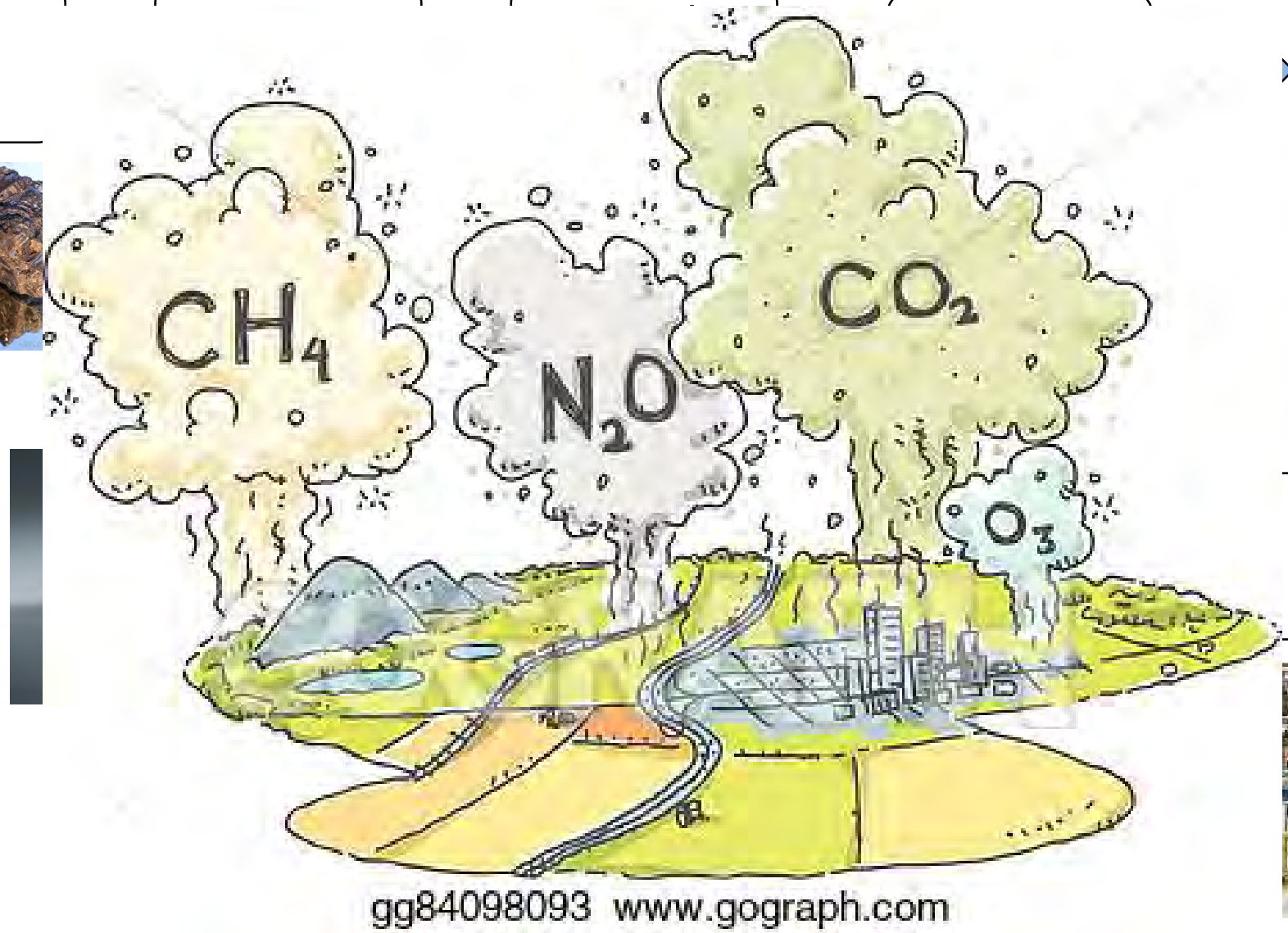
Scope 2: GHG emissions that occur at non-company owned facilities that generate electricity purchased and consumed by the company.

Scope 3: Indirect GHG emissions from upstream operations in a company's supply chain and downstream by the company's customers and end-use consumers; e.g., emissions from extraction and processing of purchased materials; transportation of purchased and sold goods; and customers' use of the company's products and services.



We determined that Scope 3 measurement is fatally flawed.
Consider the multi-tier supply and distribution chain of a car door manufacturer

BHP



Car Door Manufacturer

Our 2021 Discovery: Tracing GHG emissions through corporate supply and distribution chains can be based on simple, basic accounting practices

Activity Based Costing for Multi-Product Company

- Accurately assigns production and overhead costs to each individual products

Full and Accurate Costing of each Manufactured Product

- Finished Goods Cost = Raw Materials Cost + Direct Labor Cost
  + ABC-assigned Production and Manufacturing “Overhead” Costs

Buyer’s Raw Materials Cost = Supplier’s Finished Goods Cost (plus profit markup), which is how all material and labor costs ripple up a value chain of suppliers and customers

A new E-liability System replaces infeasible Scope 2 and Scope 3 measurements with arm's-length and auditable Scope 1 transactions

- Each company in a supply chain measures it Scope 1 GHG emissions in each reporting period as "E-liabilities" in its E-accounting books, in units of emitted CO_2, CH_4, N_2O, etc.
- The company allocates its E-liabilities to individual products using cost-accounting (ABC) techniques. When it sells a product to a customer, the price includes the manufacturer's cost for the product (plus mark-up) **AND** the product's allocated E-liability.
- The process continues until the end-consumer receives both the product itself and an accounting of the total E-liabilities generated in its production and distribution (cf., nutrition labels) – the consumer's purchasing decision can be influenced by this additional information.
- The audited records can be incorporated into a blockchain.

E-liability Accounting for Car Door Manufacturer

E-liability flows	Tons of CO_2
Opening E-liabilities	**3,600**
Add E-liabilities directly produced through operations	2,600
Add E-liabilities acquired from suppliers	39,800
Electricity	*5,600*
Sheet steel	*10,600*
Glass	*5,400*
Fabric and Plastic	*1,200*
Other supplies/components	*4,800*
Capital equipment	*12,200*
Subtract E-liabilities transferred to customers	(32,600)
Closing E-liabilities	**13,400**
Change in E-liabilities during period	*9,800*

E-liability Accounting and Transfers

Tier-5 Company E-Liability CO_2 Account

0. E-Liability (Start-of-Period)
1. E-liability purchased and produced during period
2. E-liability of products transferred to customers
3. E-Liability (End-of-Period)

Tier-4 Company E-Liability CO_2 Account

0. E-Liability (Start-of-Period)
1. E-liability purchased and produced during period
2. E-liability transferred to customers
3. E-Liability (End-of-Period)

Tier-3 Company E-Liability CO_2 Account

0. E-Liability (Start-of-Period)
1. E-liability purchased and produced during period
2. E-liability transferred to customers
3. E-Liability (End-of-Period)

Tier-2 Company E-Liability CO_2 Account

0. E-Liability (Start-of-Period)
1. E-liability purchased and produced during period
2. E-liability transferred to customers
3. E-Liability (End-of-Period)

Tier-1 Company E-Liability

0. E-Liability (Start-of-Period)
1. E-liability purchased and produced during period
2. E-liability transferred to customers
3. E-Liability (End-of-Period)

End-use Consumer E-Liability CO_2 Account

0. E-liability purchased during period

Post the E-liability on the car's purchase sticker, along with its price build-up

3. Corporate engagement to reduce poverty and environmental degradation. Who are the 900 million still living in dire poverty?

The estimated 500 million smallholder farmers in developing countries are among the world's poorest and most vulnerable people. 80 percent of the extreme poor (living on less than $1.90 per day) and 75 percent of the moderately poor (living on $1.90 to $3.20 per day) live in rural areas, working in agriculture. They lack the capacity, incentives, or proximity to integrate effectively into formal markets and corporate value chains.

Create win-win partnerships among multiple stakeholders to raise income and reduce environmental degradation of Smallholder Farmers

External Funders

Public Sector

Bank Insurance Seeds Irrigation Fertilizer Crop Protection Mechanical equipment Storage Processor Trader

NGOs

Smallholder Farmer

The difficult problem in creating win-win inclusive growth ecosystems. Different actors have different perspectives and expectations….

We create alignment by updating the traditional Balanced Scorecard to reflect the multiple outcomes and stakeholders for an inclusive growth strategy

Triple Bottom Line Outcomes

Financial Outcomes
- Revenue Growth
- Return on Investment

Social Outcomes
- Improve Family Life and Employment
- Relieve Poverty in the Poorest Communities

Environmental Outcomes
- Reduce our Environmental Footprint
- Restore Degraded Land and Water

Value for Ecosystem Stakeholders

- Increase market share with supply chain and financial partners
- Serve more clients, partners & beneficiaries
- Enter new segments of the market and/or new markets and businesses
- Create / support systemic change in priority ecosystems benefitting all actors
- Mitigate Potential Risks from Current Business Practices or Products

Create unique and differentiated value propositions to transform inefficient ecosystems

Sustainable & Innovative Processes

Product & Service Innovation
Increase penetration of our products and services to those at bottom-of-pyramid

Demand Generation
Increase demand for products and services supplied by low-income populations

Environmental Management
Eliminate waste; improve productivity of our resource inputs; reduce net GHG emissions

Key Enablers and Resources

Financial Resources
Attract external funding for ecosystem development

Organisational Model
Develop collaboration and relationship-building capabilities

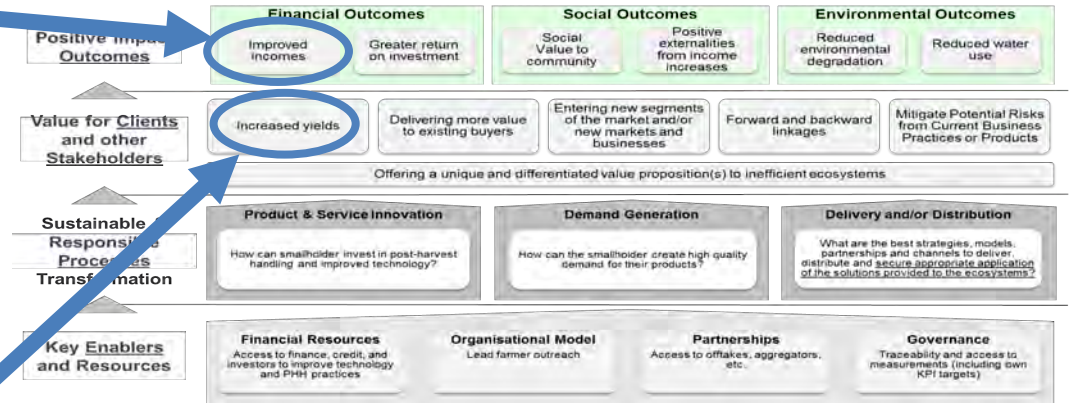
Partnerships
Enhance relationships with NGOs and local intermediaries

Governance
Establish ecosystem measurement and governance systems

Linked strategy maps connect each participant's goals to overall ecosystem success.

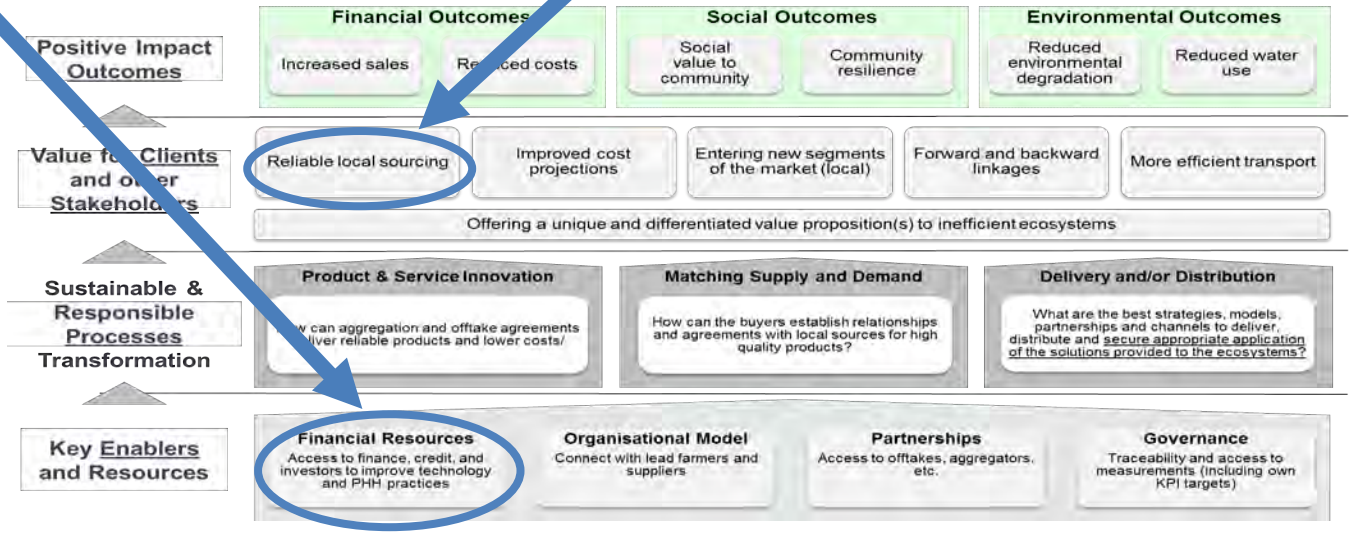
Lead Company

Smallholder



The "Catalyst"

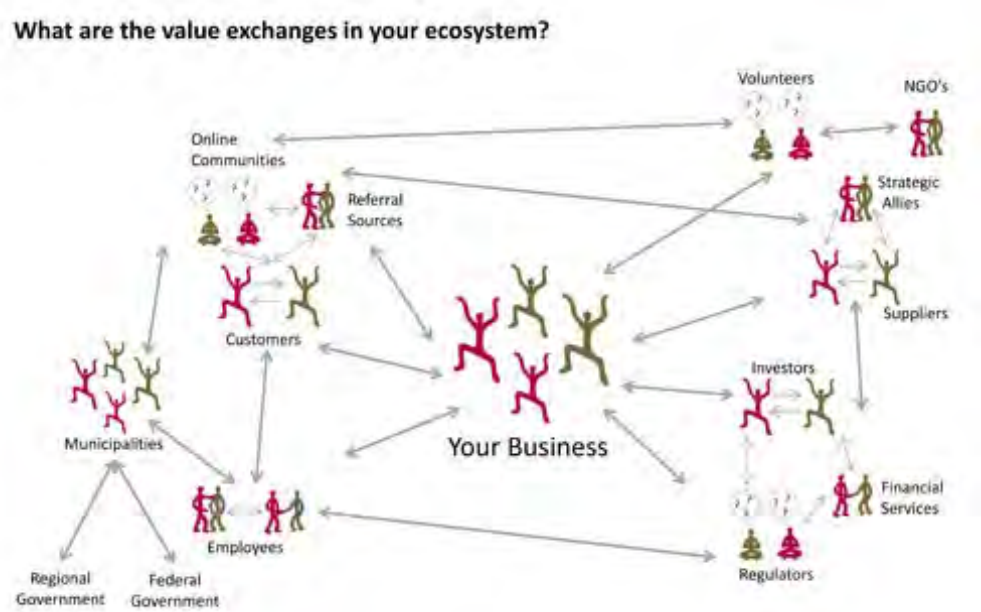
Local Buyer



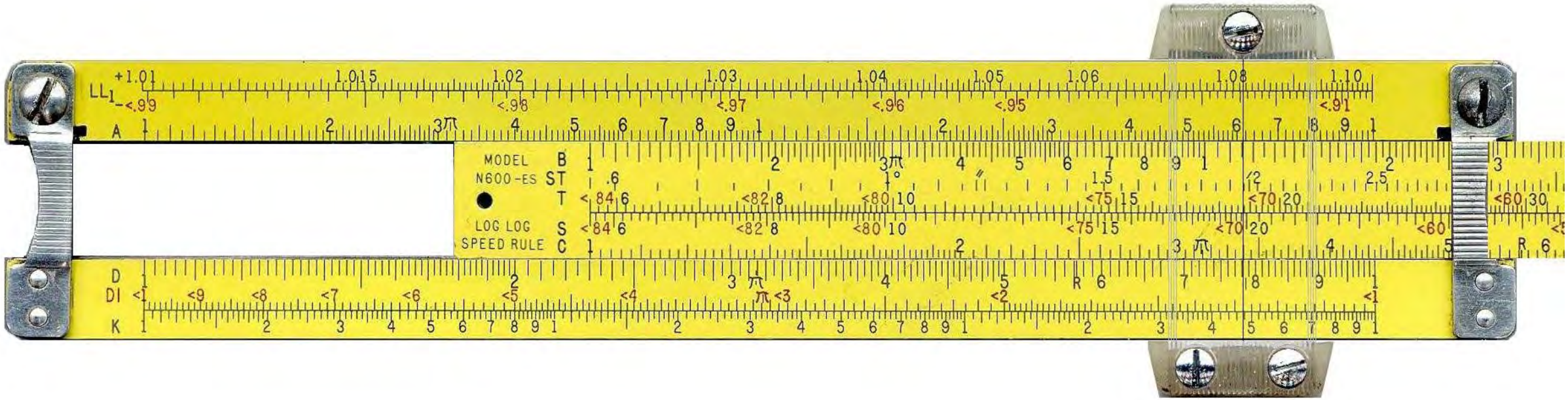
Grow and Govern the Inclusive Growth Ecosystem

- Creating scorecards among ecosystem participants builds trust, understanding, consensus and commitment.

- Ecosystem balanced scorecards (BSC) also provide the foundation for an accountability and governance system that informs periodic meetings, among all stakeholders, to monitor and guide its growth.



Summary: What I remembered from six years of engineering study at MIT, 60 years ago



It’s Better to Measure Things Approximately Right than Precisely Wrong!