



HOME >> MANAGEMENT

JAN 02 2019 **MANAGEMENT**

# 3 Strategies of the Most Innovative Universities

Top-ranked institutions invest in R&D, support collaboration spaces and maintain industry partnerships.



## Latest Articles



Adapt These Settings For Faster Windows 10

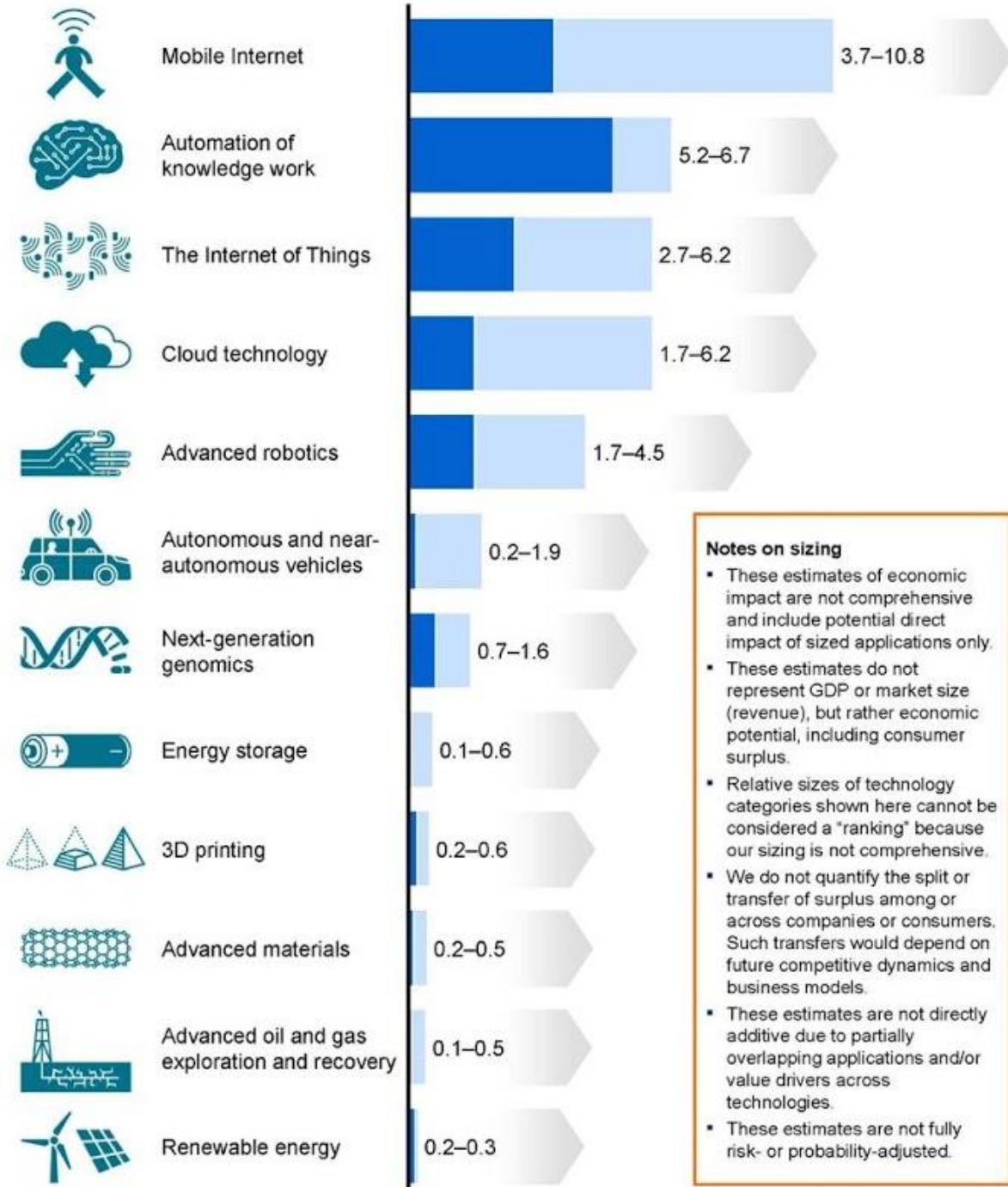


Are Colleges And Universities Meeting The Online Learning Challenge



Keep Wi-Fi 6 In Mind When Planning Network Upgrades

\$ trillion, annual



**Notes on sizing**

- These estimates of economic impact are not comprehensive and include potential direct impact of sized applications only.
- These estimates do not represent GDP or market size (revenue), but rather economic potential, including consumer surplus.
- Relative sizes of technology categories shown here cannot be considered a "ranking" because our sizing is not comprehensive.
- We do not quantify the split or transfer of surplus among or across companies or consumers. Such transfers would depend on future competitive dynamics and business models.
- These estimates are not directly additive due to partially overlapping applications and/or value drivers across technologies.
- These estimates are not fully risk- or probability-adjusted.



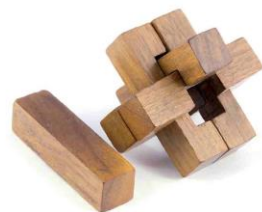
*Innovation? starts with a repurposing of the R&D that we do - a renewal of our commitment to serve as agents of positive **societal change.***

# Impact Science

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*CP David, Ph.D.  
National Institute of Geological Sciences  
University of the Philippines Diliman*

International School for Research Impact Assessment, October 8-12, 2017, Denmark



**The International School**  
on Research Impact Assessment

# **E** EL IMPACTO DE LA CIENCIA EN LA SOCIEDAD

**BERTRAND RUSSELL**

PREMIO NOBEL DE LITERATURA 1950



**AGUILAR, S. A. DE EDICIONES**

# Framework for R&D

*R&D is a form of public investment no different from investing in social services, education, or in infrastructure.*

*It is directed towards wealth generation - economic gains, manpower development, IP and know-how; and wealth preservation - industry competitiveness, reduction of disaster impacts, environmental protection.*

# Evolution of the Role of R&D

## Teaching-centric

-R&D conducted to improve teaching and capacity building

University Ranking

#PhDs/University

PRC passing rate

CHED COE/COD

## Peers-centric

-R&D conducted to contribute to the overall scientific knowledge

Publications

Patents

Impact factors

Citations H-index

DOST 6Ps

## Society-centric

-R&D as a tool for positive societal change

Impact Assessment

Economic gains

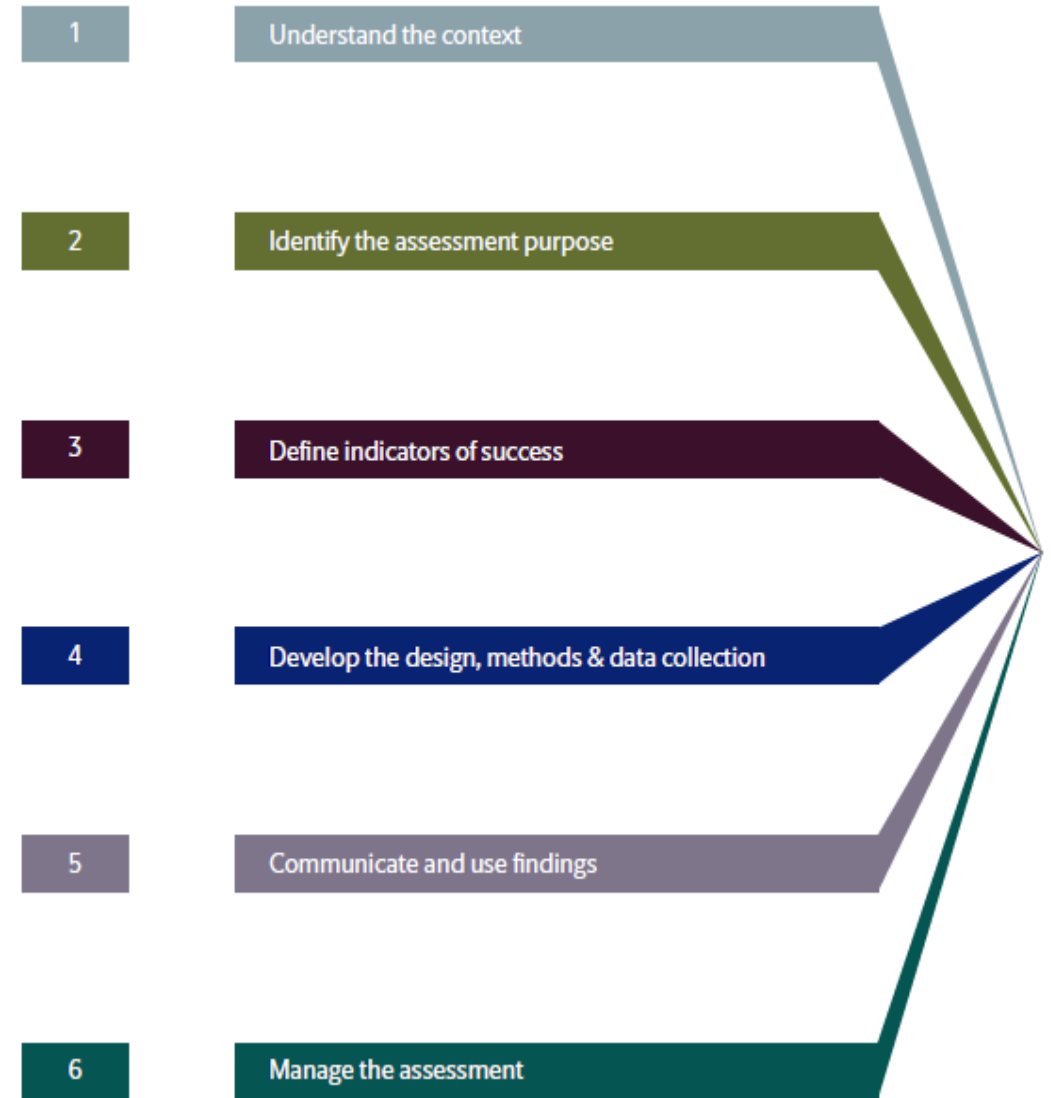
Startups graduated



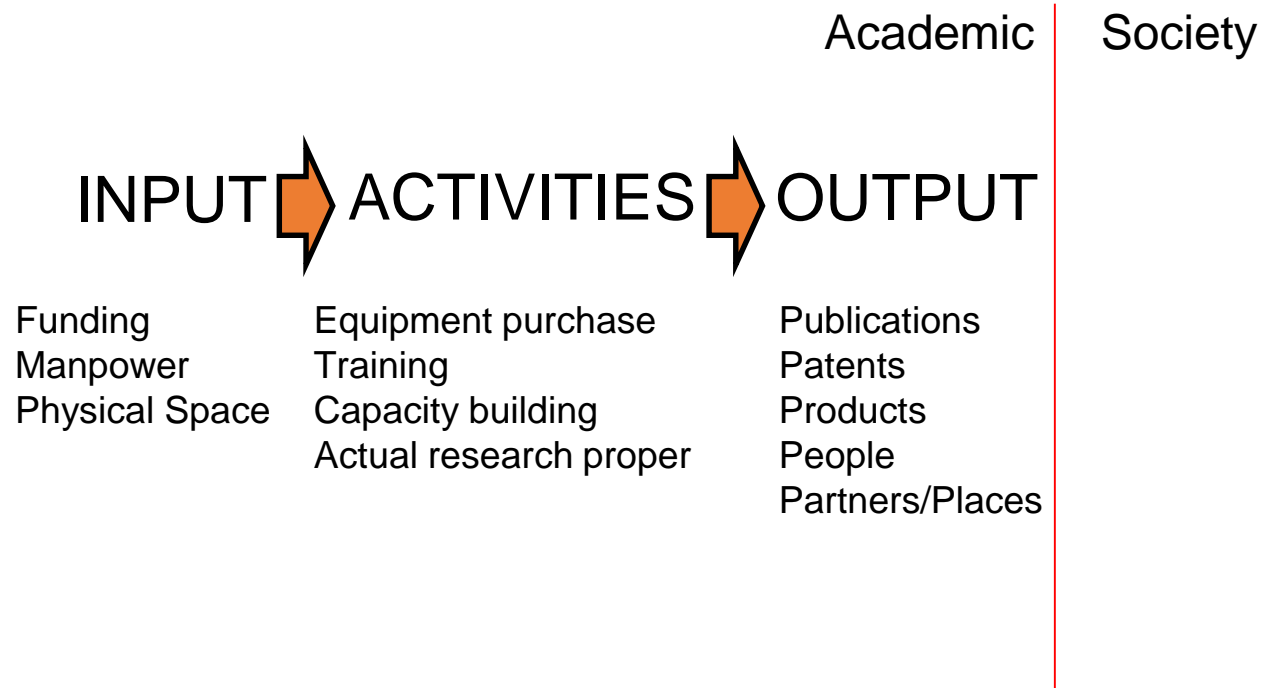


# 6 Blocks of RIA

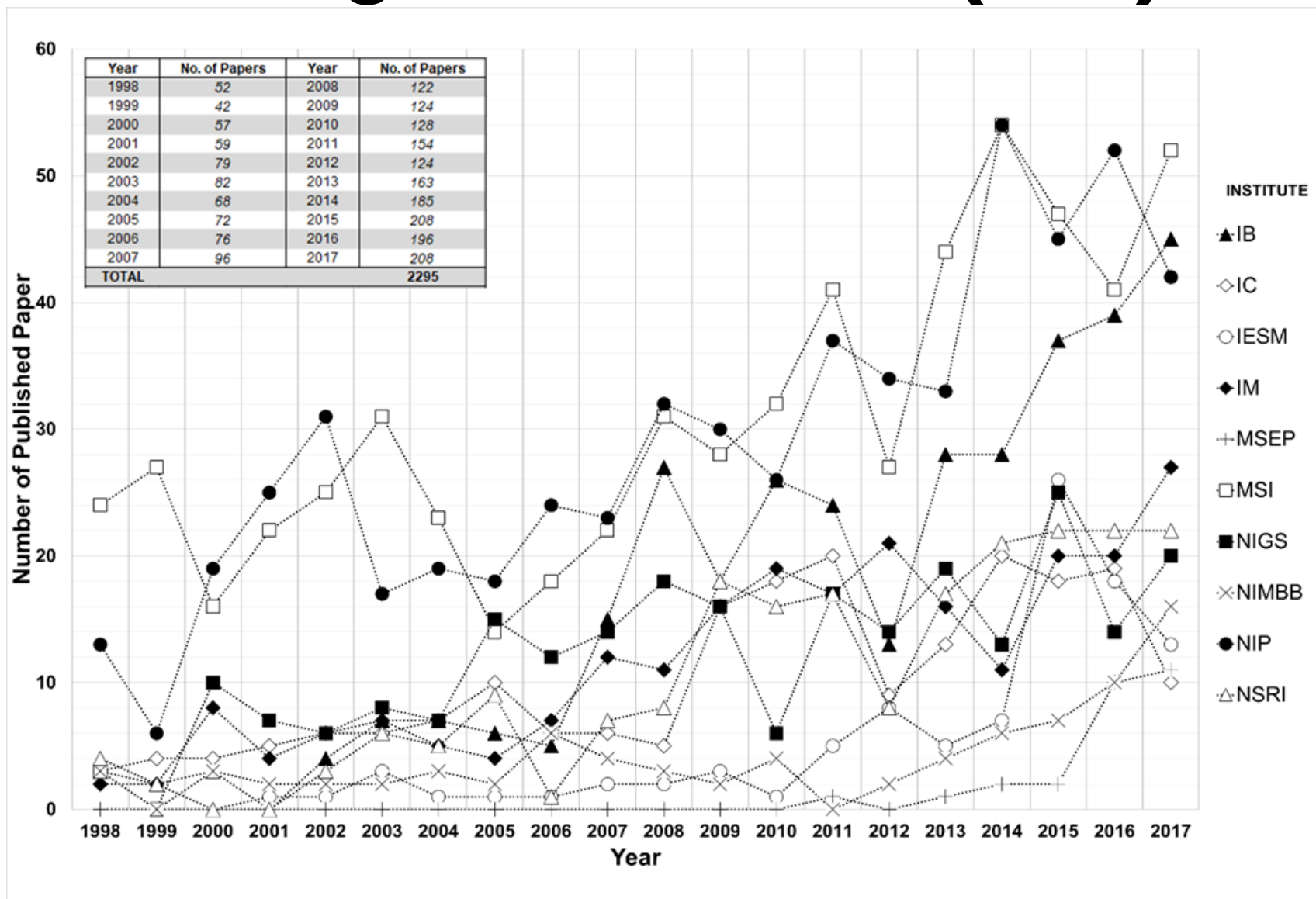
1. Framework
2. Purpose
3. Indicators of Success
4. Data collection and monitoring
5. Communicating the impact
6. Management of PIA



# Research Impact Framework

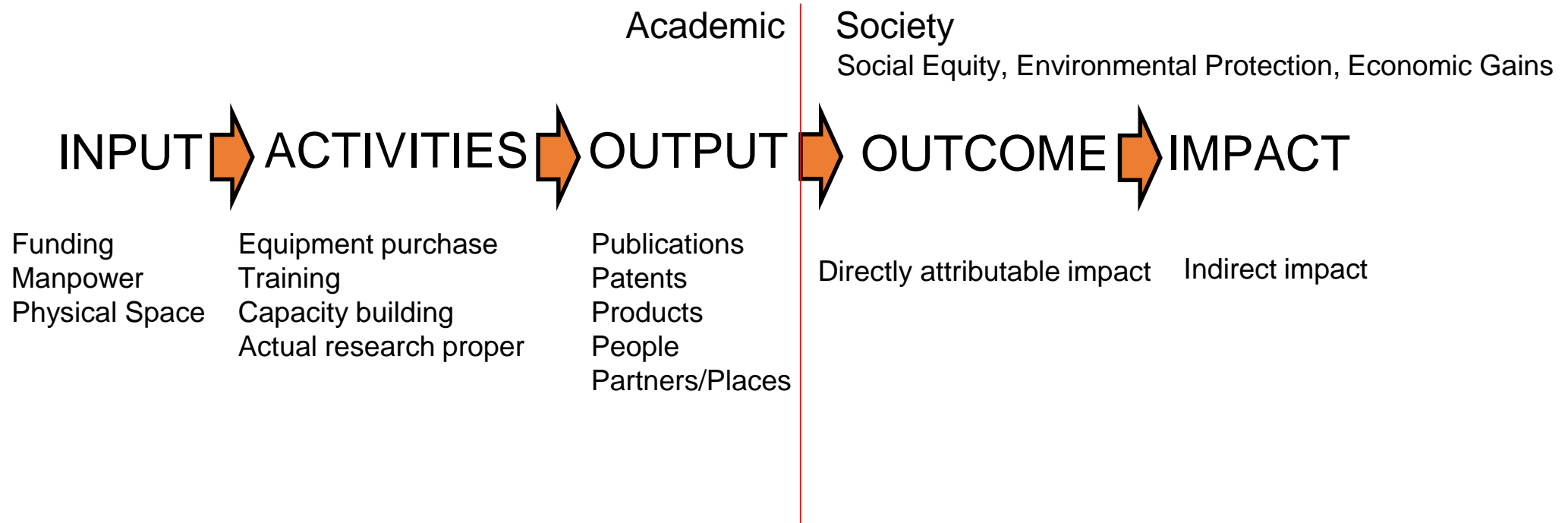


# UPD College of Science (170)



| University                      | Ongoing projects 2014-2016 |         |       |      |       | No. of personnel Involved | Total Funds   | Publication from DOST Projects | Research Index |
|---------------------------------|----------------------------|---------|-------|------|-------|---------------------------|---------------|--------------------------------|----------------|
|                                 | PCIEERD                    | PCAARRD | PCHRD | DOST | Total |                           |               |                                |                |
| UP Diliman                      | 43                         | 34      | 10    | 107  | 194   | 1,572                     | 3,467,647,155 | 141                            | <b>577</b>     |
| UP Los Baños                    | 13                         | 117     | 1     | 52   | 183   | 1,077                     | 1,403,472,302 | 35                             | <b>332</b>     |
| Central Luzon State University  | 1                          | 38      | 0     | 10   | 49    | 204                       | 252,077,859   | 20                             | <b>63</b>      |
| Visayas State University        | 1                          | 28      | 0     | 2    | 31    | 194                       | 274,705,079   | 5                              | <b>61</b>      |
| UP Visayas                      | 1                          | 28      | 0     | 11   | 40    | 172                       | 232,808,124   | 2                              | <b>55</b>      |
| Ateneo de Manila University     | 11                         | 1       | 5     | 4    | 21    | 170                       | 147,218,972   | 20                             | <b>46</b>      |
| UP Manila                       | 0                          | 0       | 17    | 15   | 32    | 87                        | 267,936,166   | 0                              | <b>39</b>      |
| De La Salle University          | 6                          | 8       | 0     |      | 14    | 116                       | 110,282,706   | 27                             | <b>32</b>      |
| Isabela State University        | 2                          | 10      | 0     | 3    | 15    | 102                       | 117,809,094   | 7                              | <b>30</b>      |
| Mindanao State University - IIT | 4                          | 0       | 0     | 2    | 6     | 77                        | 102,582,575   | 5                              | <b>23</b>      |
| Central Mindanao University     | 2                          | 12      | 0     | 3    | 17    | 81                        | 143,269,575   | 1                              | <b>28</b>      |
| Mapua Institute of Technology   | 3                          | 0       | 0     | 2    | 5     | 97                        | 107,632,538   | 1                              | <b>27</b>      |
| University of So Mindanao       | 0                          | 18      | 0     | 1    | 19    | 76                        | 101,038,892   | 4                              | <b>24</b>      |
| UP Mindanao                     | 0                          | 1       | 0     | 3    | 4     | 63                        | 142,855,492   | 1                              | <b>23</b>      |
| Caraga State University         | 4                          | 0       | 0     | 2    | 6     | 67                        | 94,010,673    | 19                             | <b>21</b>      |
| UP Cebu                         | 1                          | 0       | 0     | 2    | 3     | 67                        | 93,870,200    | 7                              | <b>20</b>      |
| University of San Carlos        | 0                          | 1       | 0     | 3    | 4     | 49                        | 97,822,043    | 0                              | <b>17</b>      |
| Ateneo de Naga University       | 0                          | 0       | 0     | 2    | 2     | 47                        | 91,304,167    | 0                              | <b>16</b>      |
| Ateneo de Zamboanga Univ        | 0                          | 0       | 0     | 2    | 2     | 28                        | 87,543,568    | 0                              | <b>12</b>      |

# Research Impact Framework



# Impact categories

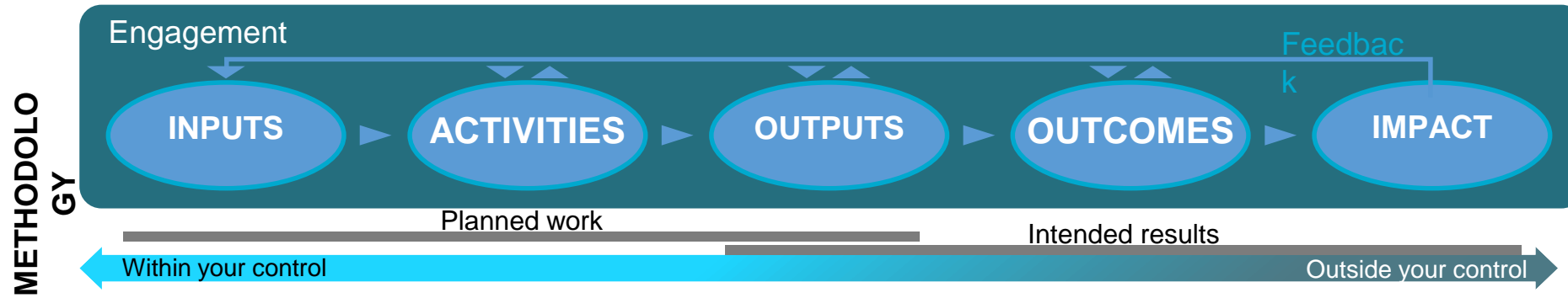
| ECONOMIC IMPACTS                                      | ENVIRONMENTAL IMPACTS                            | SOCIAL IMPACTS   |
|---|--|--|
| National economic performance                         | Air quality                                      | Health and wellbeing   |
| Trade and competitiveness                             | Ecosystem health and integrity (natural capital) | Access to resources, services and opportunities                        |
| Productivity and efficiency                           | Climate  | Quality of life (material security and livelihoods)                    |
| Management of risk and uncertainty                    | Natural hazards mitigation                       | Safety   |
| Policies and programs                                 | Energy generation and consumption                | Security (e.g. cyber, biological, civil and military)                  |
| New services, products, experiences and market niches | Land quality                                     | Resilience   |
| Animal health and prosperity                          | Aquatic environments                             | Indigenous culture and heritage  |
| Securing and protecting existing markets              | Built environments                               | Innovation and human capital (creativity and invention)                |
|   |  | Social cohesion (social inclusion, social capital and social mobility) |

# Purpose of Impact Assessment

## 4 A's

- **A**ccountability (to the Board, Donors, Stakeholders, etc.)
- **A**dvocacy (making the case for continued/increased funding/engagement)
- **A**nalysis (what projects work, timeframe)
- **A**llocation (which projects should be funded)

# Australia's CSIRO Impact Framework



| METHODOLOGY       | INPUTS   | ACTIVITIES   | OUTPUTS  | OUTCOMES  | IMPACT   |
|-------------------|--|--|--|---|--|
| <b>DEFINITION</b> | Resources applied to deliver activities, such as budget, people, equipment, etc.   | Actions taken or work performed through which inputs, such as funds, technical assistance and other types of resources are mobilised with the intention of achieving specific outputs.   | The research solutions, services, and/or capacities that result from the completion of activities within a research portfolio or project.  | The intended or desired medium term effects /change expected to be realized from successful delivery of research outputs. It usually requires the collective effort of partners.  | An effect on, change or benefit to the economy, society or environment, beyond those contributions to academic knowledge. The desired change at this level is through the collective effort of partners and outside the control of the research manager.   |
| <b>EXAMPLES</b>   | <ul style="list-style-type: none"> <li>• staff FTE</li> <li>• non-staff FTE</li> <li>• appropriation funding</li> <li>• external funding</li> <li>• grants</li> <li>• in-kind contributions</li> <li>• equipment/facilities</li> </ul> | <ul style="list-style-type: none"> <li>• research/technology development</li> <li>• education</li> <li>• industry engagement (incl. SMEs)</li> <li>• international engagement</li> </ul> | <ul style="list-style-type: none"> <li>• Publications</li> <li>• prototypes</li> <li>• patents granted</li> <li>• training packages</li> <li>• students completed</li> <li>• new services</li> <li>• new/updated standards</li> <li>• reports</li> </ul> | <p><b>Uptake</b></p> <ul style="list-style-type: none"> <li>• Training accessed by users</li> <li>• adoption of new research protocols and techniques</li> </ul> <p><b>Adoption</b></p> <ul style="list-style-type: none"> <li>• industry, government &amp;/or community usage</li> <li>• process changes implemented</li> <li>• behavioural change</li> <li>• sales of new products</li> <li>• licenses / IP sold</li> </ul> | <p><b>Economic impact</b></p> <ul style="list-style-type: none"> <li>• increased economic activity</li> <li>• higher quality workforce</li> <li>• productivity improvement</li> </ul> <p><b>Environmental impact</b></p> <ul style="list-style-type: none"> <li>• water savings</li> <li>• habitat rehabilitation</li> <li>• prevention of invasive species</li> <li>• reduced CO<sub>2</sub> emissions</li> </ul> <p><b>Social impact</b></p> <ul style="list-style-type: none"> <li>• expand knowledge economy</li> <li>• improved health &amp; wellbeing</li> <li>• reduced morbidity</li> <li>• increased social cohesion</li> </ul> |



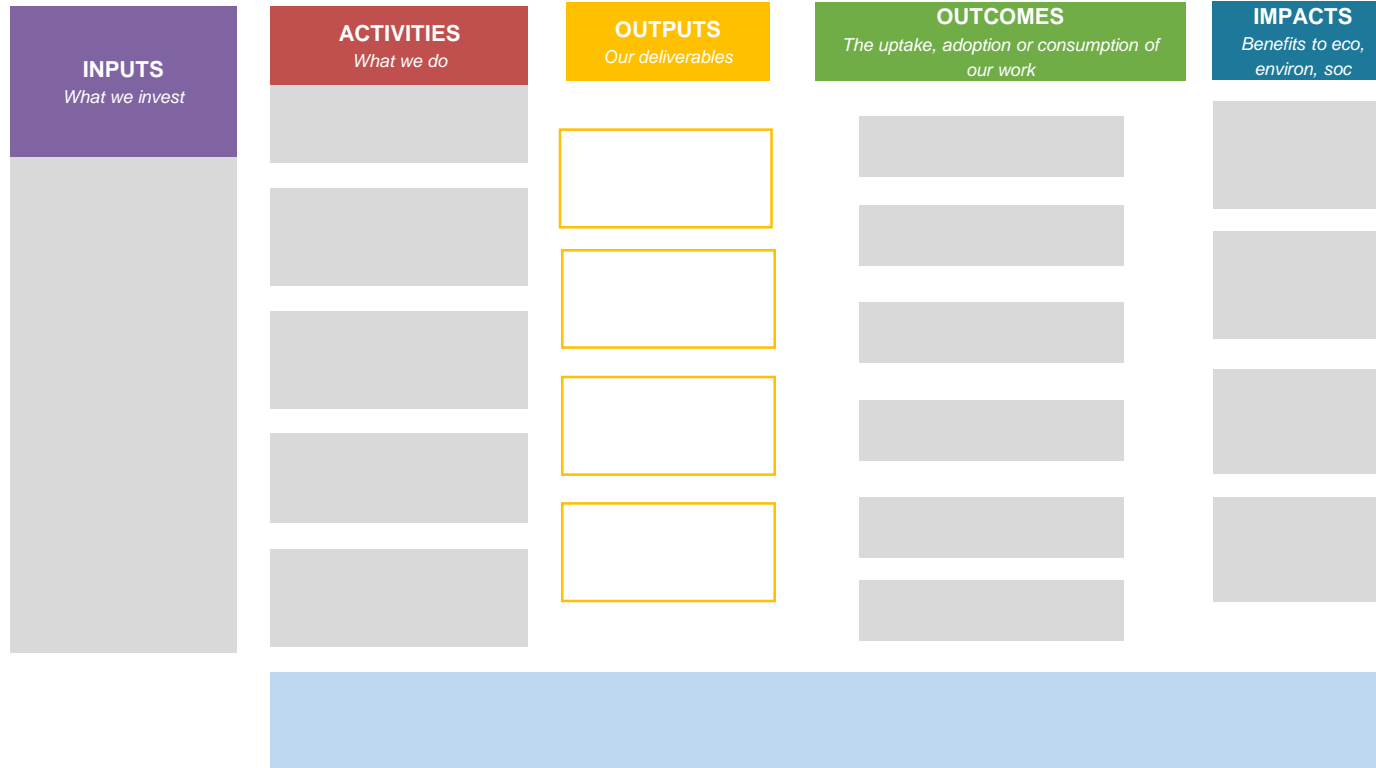
# Steps in Impact Planning and Monitoring

1. Developing the impact pathway
2. Defining the indicators
3. Measuring changes in indicators
4. Estimating attribution and counterfactual
5. Building a monitoring plan
6. Reporting

# Impact Statement Canvas

## PARTICIPATION

*Who we need to reach across the various parts of the pathway?*



**Assumptions**

**Assumptions are the beliefs we have about the programme, the participants, and how the programme will work.**

**External factors**

**External factors are those that lie beyond the control of programme management and staff but which nevertheless have a significant impact on outcomes.**

# Industrial Innovation, Manufacturing (Printed solar films)

## Impact Statement

**Advanced and innovative material technologies:** Create a sustainable competitive advantage for our commercial collaborators in the defence, transport, mining, energy, health and electronics sectors through advanced materials, materials processing and agile manufacturing technologies that will deliver a cumulative benefit of more than \$2bn by 2025.

## PARTICIPATION

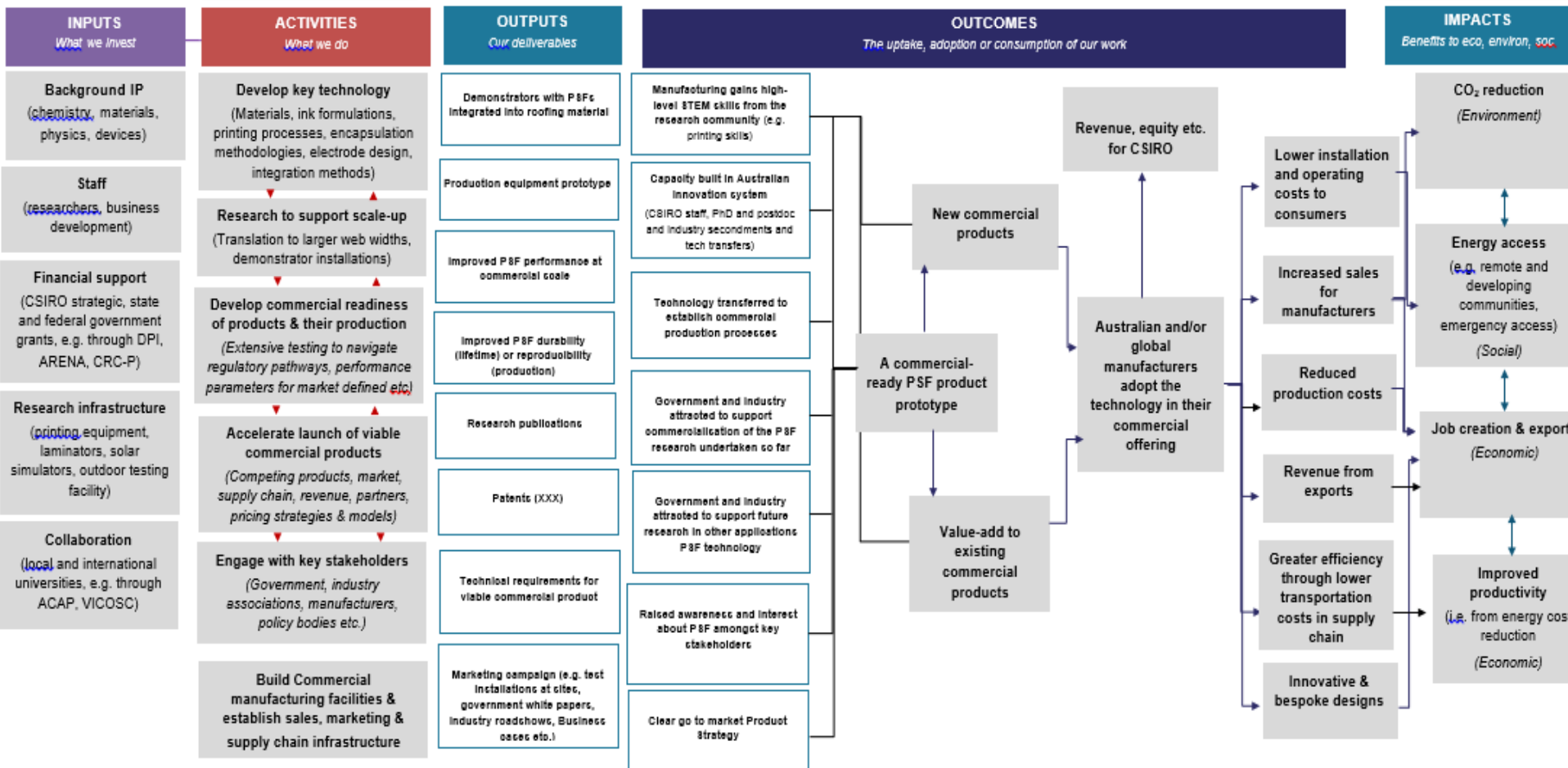
CSIRO researchers and BD; government; university collaborators

CSIRO researchers and BD; government, university collaborators; potential manufacturers and end-users;

CSIRO researchers, BD, patent, and comms staff; end-users; manufacturers, designers

CSIRO BD and commercialisation and patent staff; manufacturers; distributors and retailers; sales and marketing teams; some CSIRO researchers may be seconded into existing manufacturers or spin-outs/new manufacturers for technical support to manufacturing; general public, government and NGOs as potential customer bases

Consumers; government; NGOs; manufacturers; distributors and retailers; CSIRO impact team



### Assumptions:

- CSIRO printed solar technology is world-leading
- Rate of silicon solar cost reduction continues to plateau post-2017
- Competitive performance (efficiency, lifetime) for PSF can be achieved

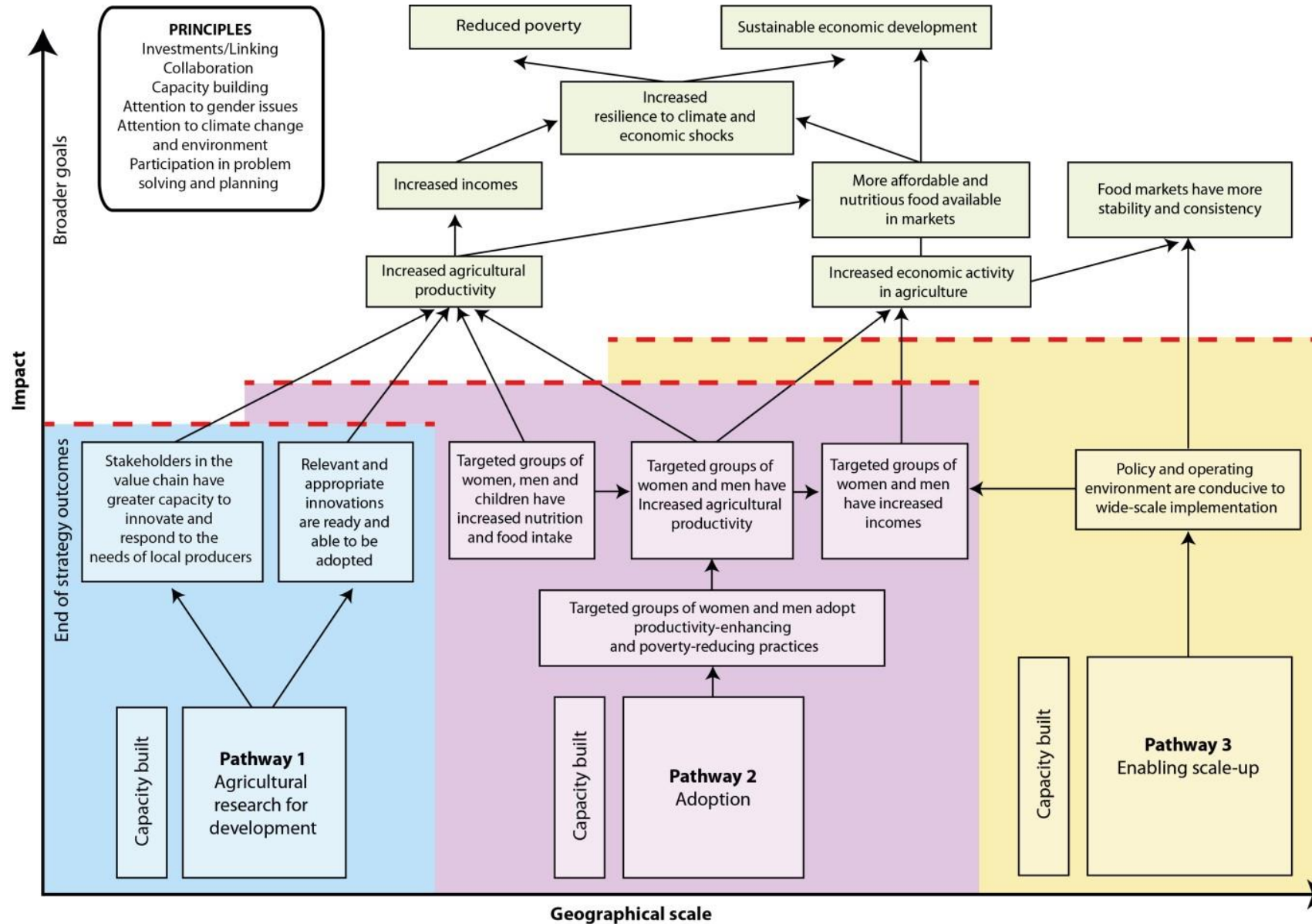
### Risks:

- Government policy makes solar technology investment less attractive
- Consumer trends favour alternative renewable energy sources
- Building or product regulators delay approvals

### The counterfactual

- Alternative next generation solar technologies are slower to market/less efficient/xx?
- xxx?

# Example: multiple pathways project



Remote sensing for water resources

Meteorologic Data analytics

GIS for water resources

Water quality analysis

Tools for hydrologic mapping

Rainfall-Runoff computation

Mapping and field survey

Water quality improvement

Multi-use resources

Determination of water sources

Infrastructure required

Increased access to clean water

Reduced waterborne diseases

# Choosing a Good Indicator

Make sure your indicators meet the SMARTA criteria:

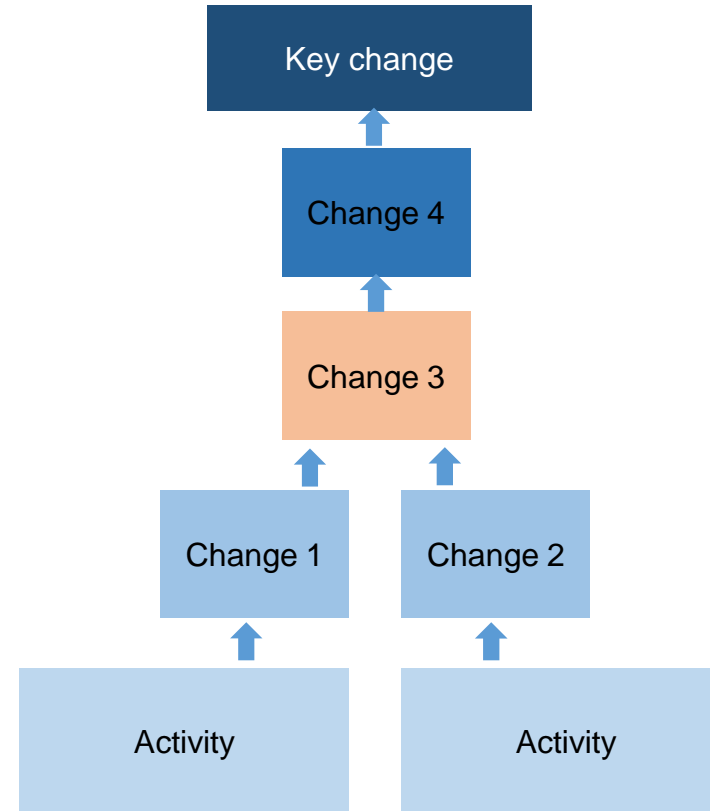
- **Specific** (a concise and precise statement of what you want to accomplish, by when and how)
- **Measurable** (identify how you will measure, ideally before you start - If the indicator is not measurable, then you can't use it to assess changes)
- **Actionable** (through the inputs, activities and partnerships of the Business Units)
- **Reasonable** (to expert opinion, given the nature of the challenge and capability available)
- **Time Bound** (set a deadline for achieving the indicator) and
- **Agreed** (with key stakeholders e.g. policymakers, experts, peak bodies)

# What's an indicator?

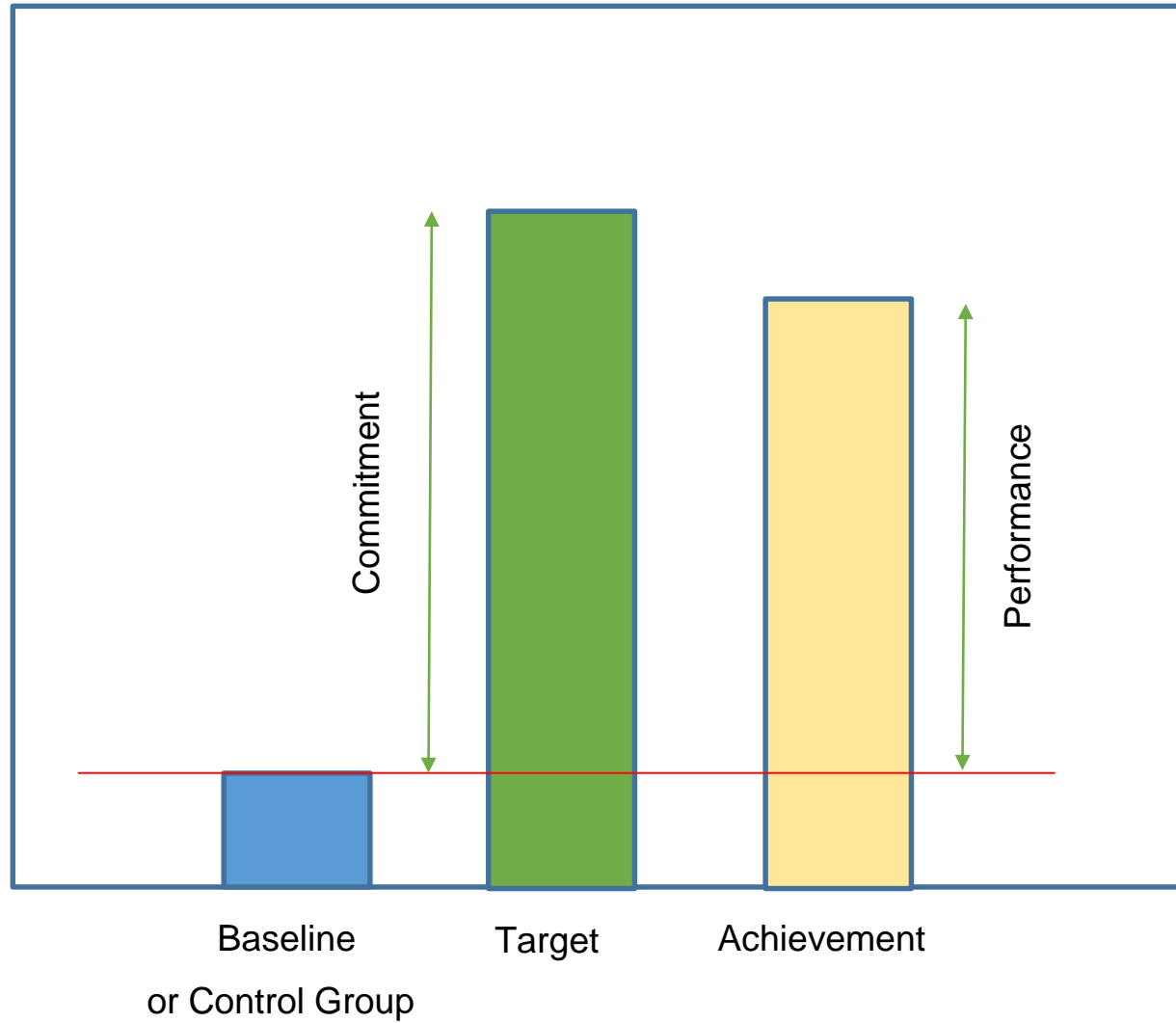
Indicators specify the expected changes in the boxes

Indicators show you:

- If expected changes are happening
- To what extent changes are occurring
- How and why changes are taking place



# Indicators







# The DOST Impact Pathway

## **Academic**

- Publications and citations
- Human capital development

## **Policy**

- Science-based policies
- Support to Government Agencies

## **Economic**

- Commercialization
- Industry competitiveness
- Regional development

## **Civic**

- Equity
- Community improvement
- Environment protection





## PCIEERD's HYBRID TRAIN

### INPUTS

~160 Million in funding  
~20 engineers  
3 years of R&D  
3 years of Marketing

### ACTIVITIES

Training of Researchers  
Design and Construction  
Testing and Certification  
Testing equipment

### OUTPUTS

Blueprint for  
Hybrid train set  
Train unit

### OUTCOMES

Adoption of PNR  
Extra commuter  
train from  
Alabang-Bicutan

### IMPACT

# Planning and monitoring checklist

## Have you...

identified **performance measures** for each level of the design logic (outputs, outcomes, impact)?

identified key **risks** at each level of the design logic?

nominated who will be the **source** (sample) of each item of data (performance and risk)?

defined **methods** to capture the data at all levels?

nominated who will be **responsible for capturing** each item of data?

scheduled when each item of data will be **captured**?

planned how the raw data will be **analysed**?

nominated who will be **responsible for analysing** each item of data?

**scheduled** when analysis will be carried out?

identified the format in which to **present/communicate** the analysed data?

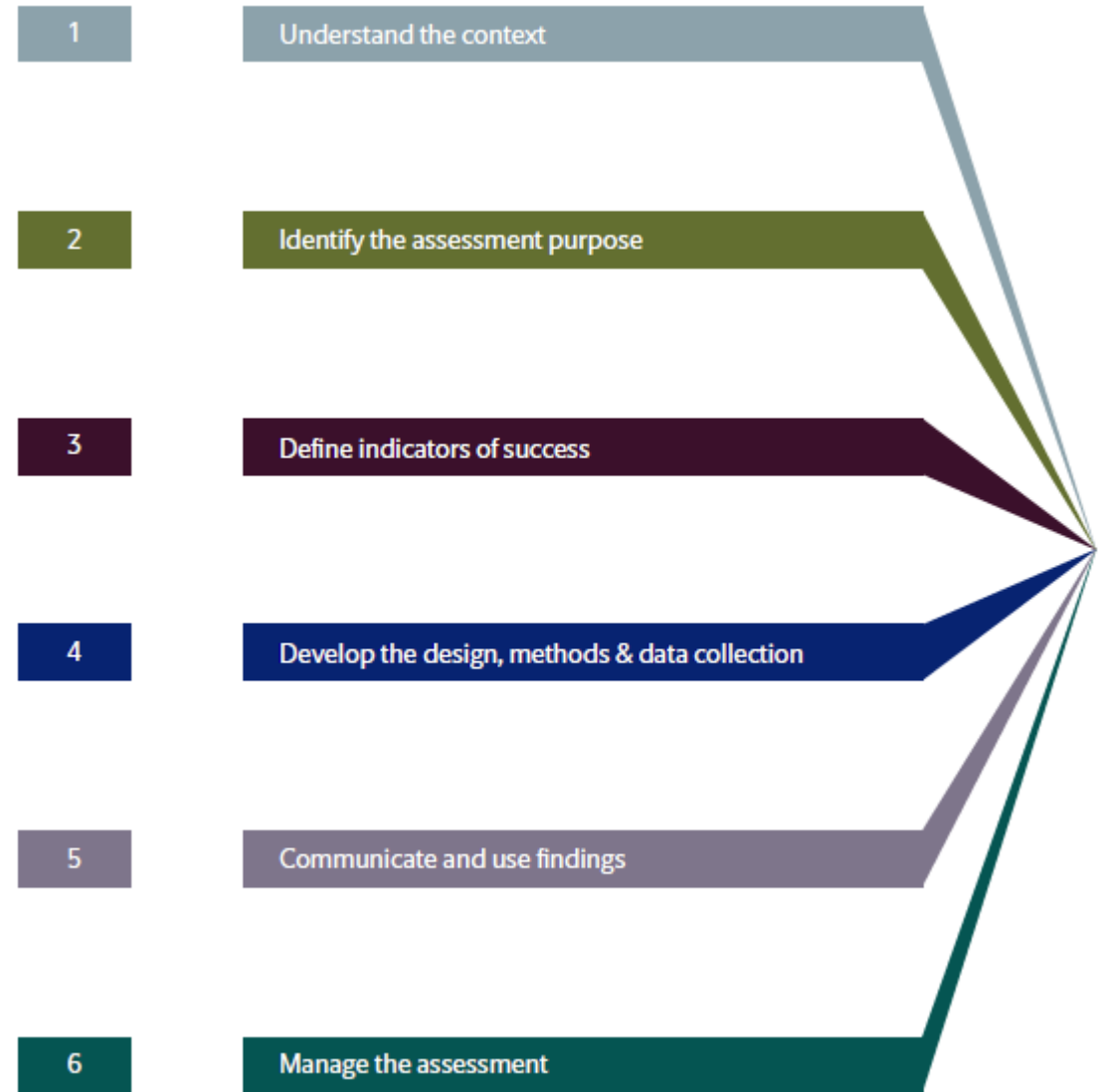
nominated who will be **responsible for presenting/communicating** analysed data?

nominated who will be the **audience** for analysed data and how they might use it?

scheduled when analysed data will be **disseminated**?

# 6 Blocks of RIA

1. Framework
2. Purpose
3. Indicators of Success
4. Data collection and monitoring
5. Communicating the impact
6. Management of PIA



# 5. Communicating the Impact

## People respond to:

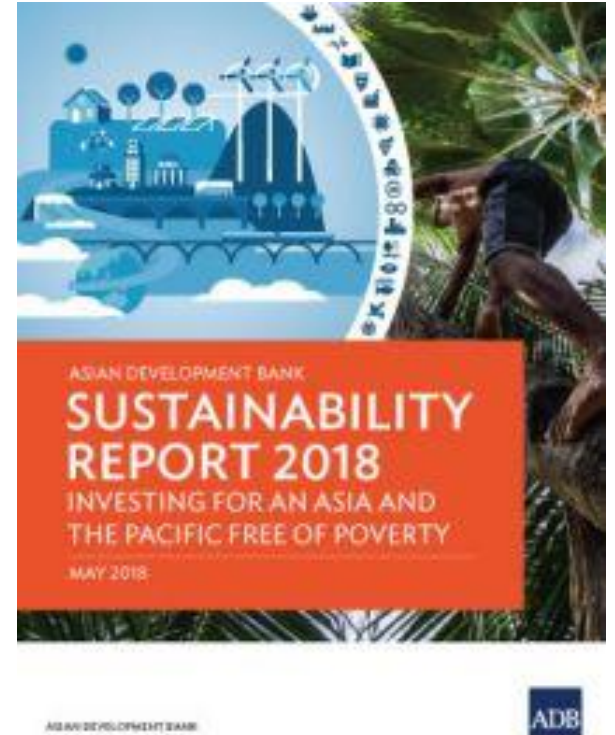
- Monetary Value
  - Benefit-Cost Analysis
  - Value for Money/Social ROI
  - Value of Statistical Life/Willingness to Pay
  - Environmental Valuation
- Statistics and Infographics
  - With vs. without intervention
- Narratives
  - Personal stories of success
  - Transformations



# Sample Reports



# Sustainability Reporting





# 5. Communicating the Impact

## DEVELOPING THE CAUSAL CHAIN – BACK TO YOUR IMPACT PATHWAY (LOGIC MODEL)

- Used to understand input-process-output relationships.
- Useful in breaking down research programmes to understand where and how impact may have, or might, occur.
- Useful in identifying 'contribution story' of the research to impact.



# Charting an Organization's Transformation

1. Identify R&D Areas where you can make an impact
2. Set Goals based on the RIA Framework
3. Set Indicators
4. Monitor Indicators quarterly
5. Report Successful Projects

# Take-Away Messages

- R&D impact assessment is already a standardized tool
- Impact is measured in only three broad impact areas: Economic benefits, Social Equity and Environmental Sustainability
- Impact science affects how we should formulate projects
- Embracing impact science provides the maximum benefits to an organization's stakeholders



Laurel, Batangas



end