UNIVERSITY OF MALAYA

Impact Oriented Interdisciplinary Research

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PART 1

- Research Cluster Restructuring

PART 2

- Impact Oriented Interdisciplinary Research

PART 1: Research Cluster Restructuring

Outline

- Context
- Research Clusters over the years
- Current Restructuring
- Research Cluster Strategy

Key Issues

Reduced Research Grants

Research Impact

Key Issues

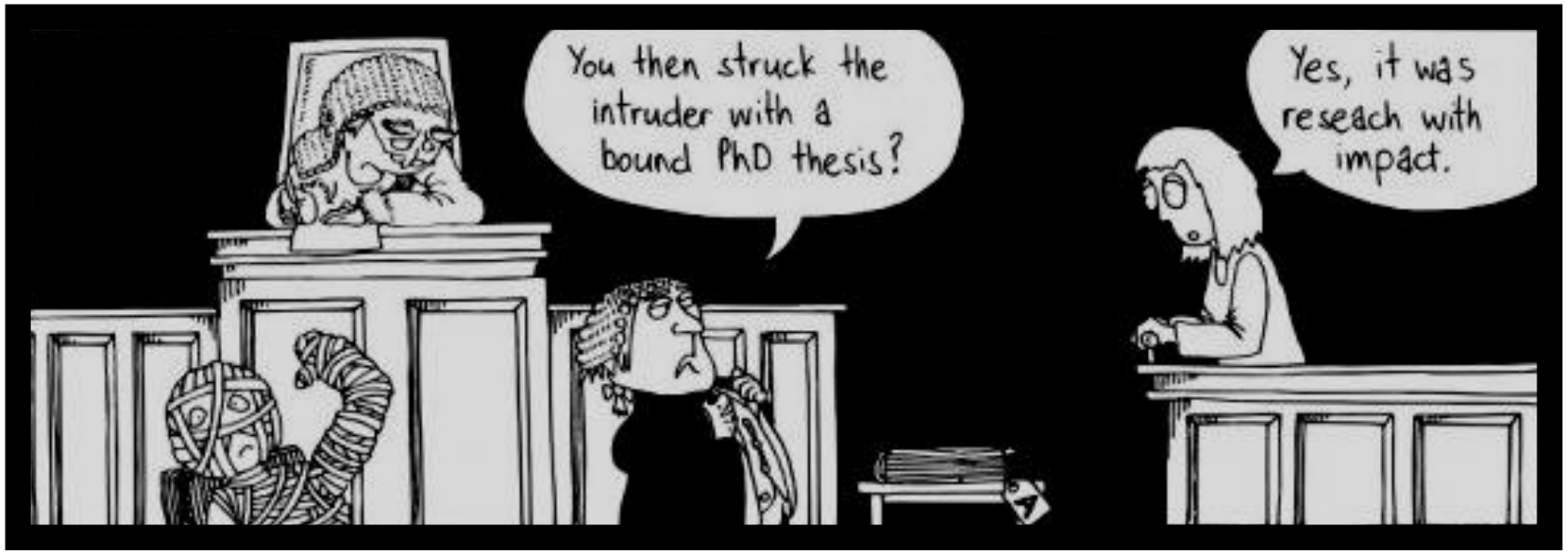
Reduced Research Grants

Implication: National grant applications become fiercely competitive

Way Forward:

- Improve grant application success rate → improve proposal quality, increase number of proposals
- Target non-traditional national research grants, in addition to traditional national grants
- Industrial engagement
- International grants

Research Impact ?



Key Issues

Research Impact

*"an effect on, change, benefit to the **economy**, **society**, **culture**, **public policy** or **services**, **health**, the **environment** or **quality of life** beyond academia"*

http://www.atn.edu.au/eia/Docs/EIA_Trial_Guidelines_FINAL.pdf

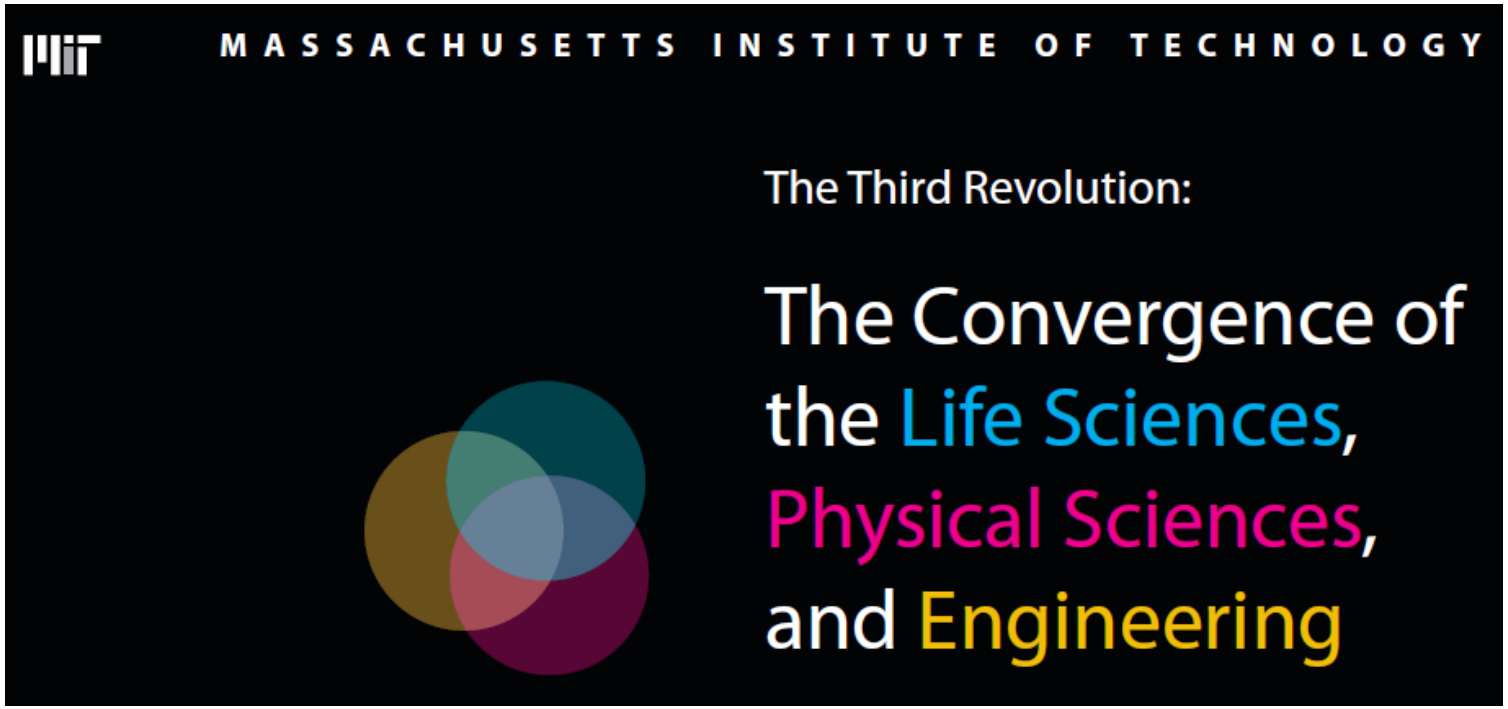
On Going Global Trend

Research Impact, interdisciplinary research, stakeholder engagement…

- UK, Australia, EU, US
- UK Research Excellence Framework
- Excellence in Research for Australia (ERA)
- Horizon 2020
- **HIBAR** (**Highly Integrated Basic and Responsive Research**) are done by the Association of Public and Land-Grant Universities (APLU)
- Grand Challenges

National Science Foundation (NSF), USA:

- Generating research question with potential societal impact is very important
- **NSF Office of Emerging Frontiers and Multidisciplinary Activities** initiated programs
  e.g., Germination of Research Ideas for Large Opportunities and Critical Societal Needs (Germination)
- NSF funded $ 5 mill research centre at the University of Missouri to advance research impact



"We see convergence as a blueprint for innovation"

"Convergence is a new paradigm that can yield critical advances in a broad array of sectors, from health care to energy, food, climate, and water."

Definition of Interdisciplinary Research as Adopted by NSF

Interdisciplinary research is a mode of research by teams or individuals that ***integrates*** ***information, data, techniques, tools, perspectives, concepts, and/or theories from*** ***two or more disciplines or bodies of specialized knowledge*** *to advance fundamental understanding or to solve problems whose solutions are* ***beyond the scope of a single discipline*** *or area of research practice.**

*Committee on Facilitating Interdisciplinary Research, Committee on Science, Engineering, and Public Policy (2004). *Facilitating interdisciplinary research.* National Academies. Washington: National Academy Press, p.2.

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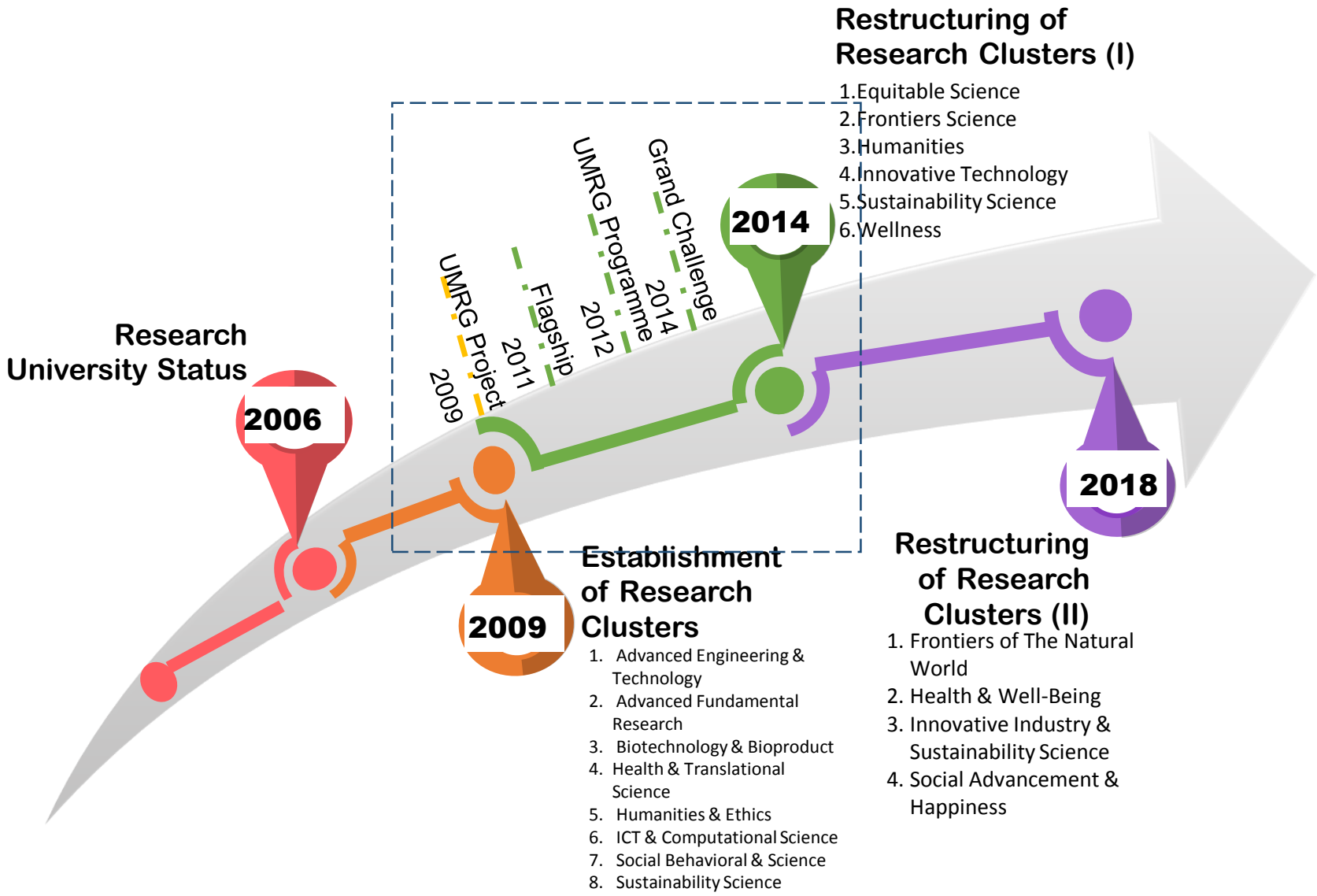
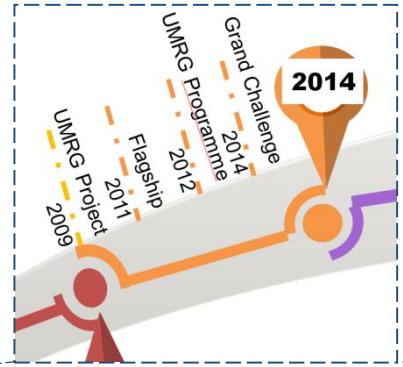
Research Cluster Evolution



Evaluation of Research Programs

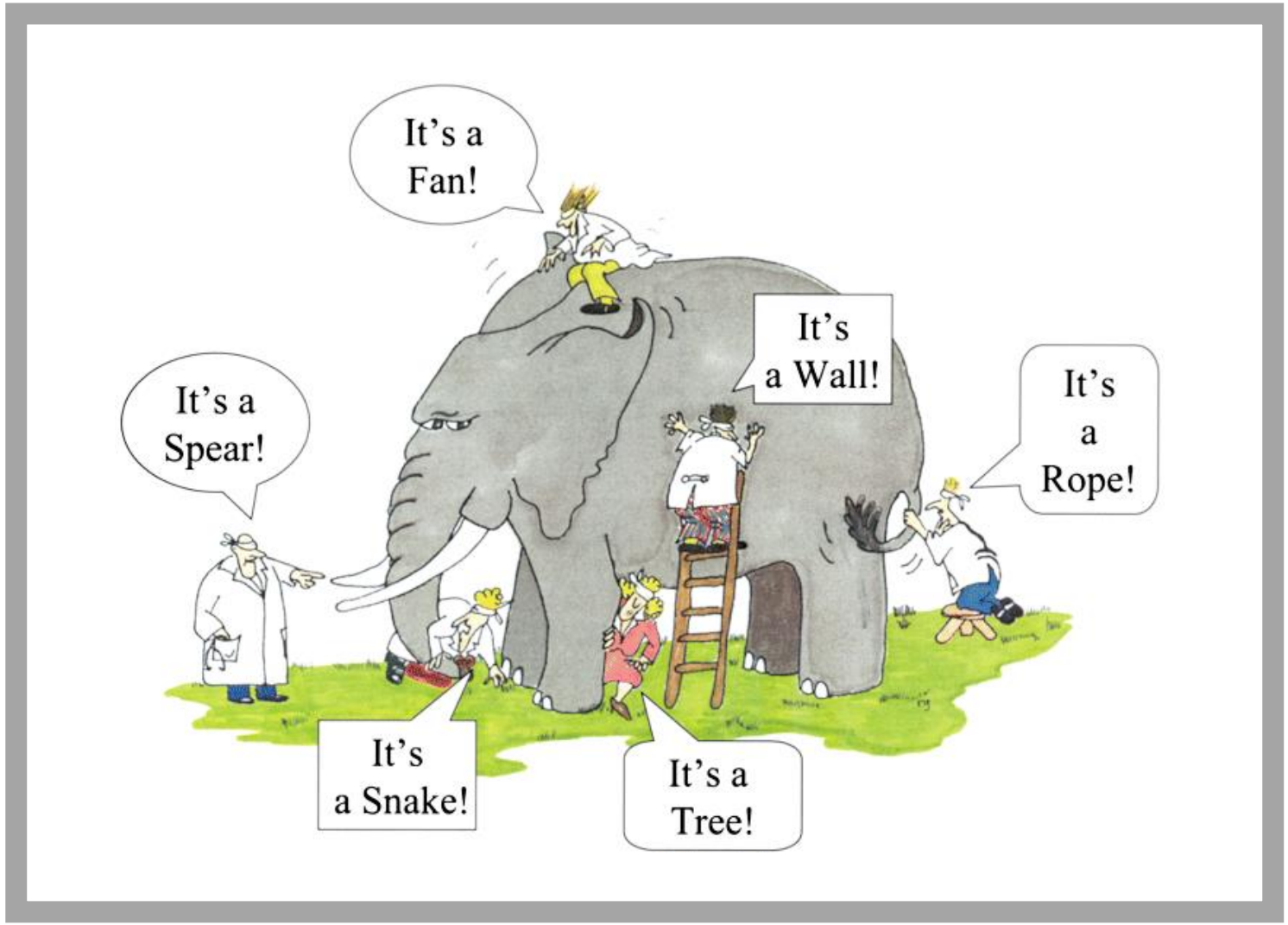


Individual Research Project ••• Research Programs ••• Grand Challenges (GC)

Still researchers work in isolation in may cases

Useful learning experience

Talking about interdisciplinary research…



Interdisciplinary research in many Research Programs !!!

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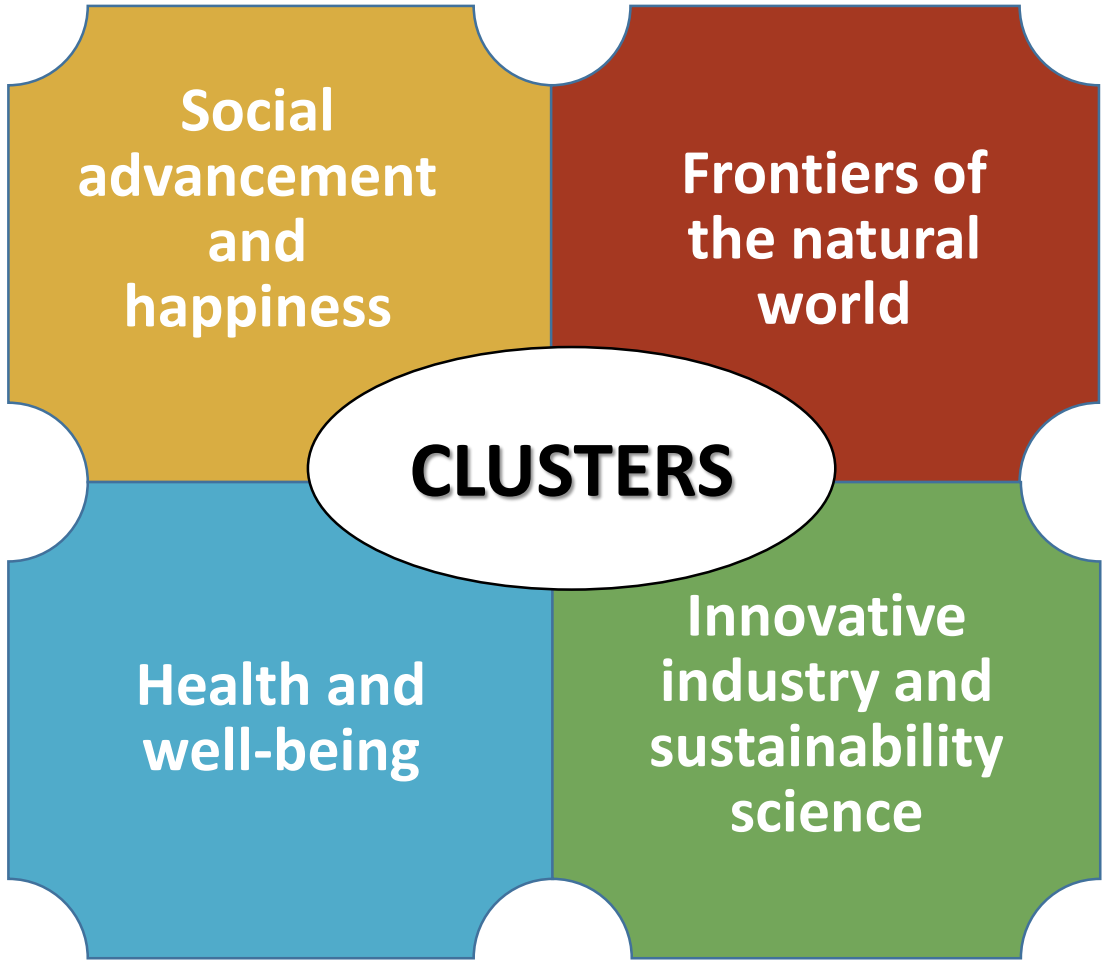
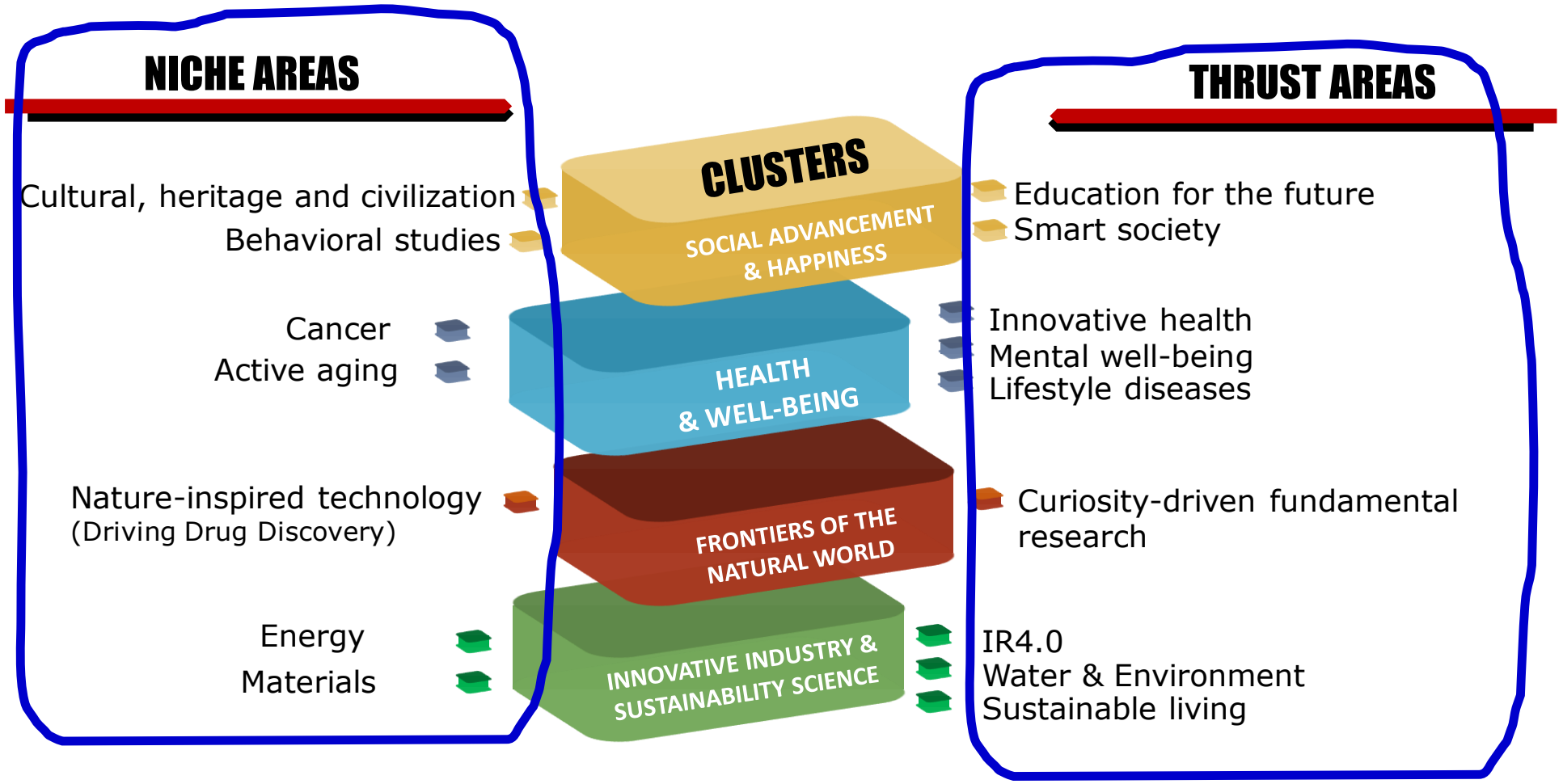
After analyses of data, series of workshops with faculties, research centres and meetings with management…

Consolidation:

4 Research Clusters



IIRG RESEARCH NICHE AND THRUST AREAS



Niche Area and Thrust Area

NICHE AREA

- *Specialised research areas with strong foundation already existing in the University*

Characteristics:-

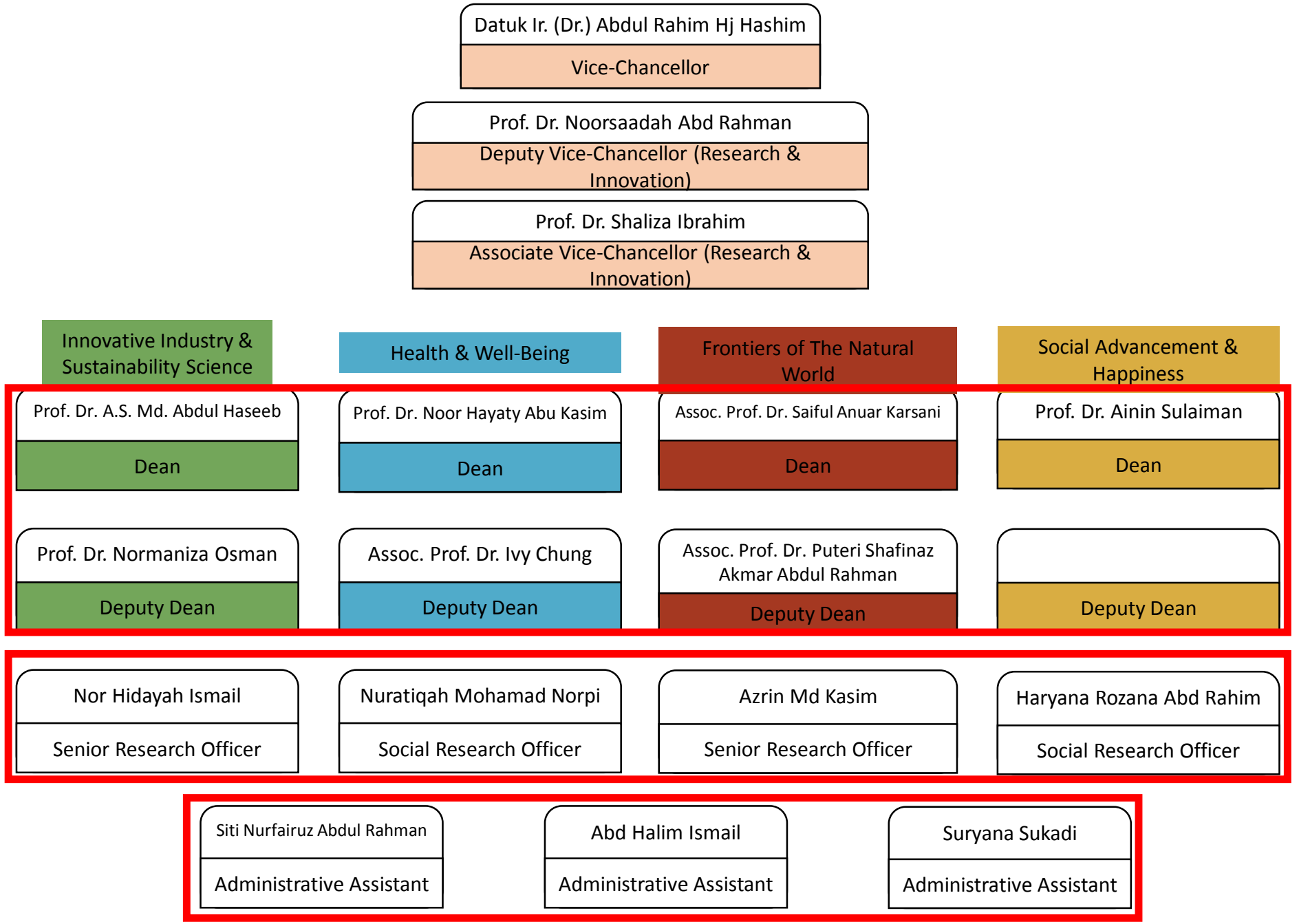
- With strength (volume of research, visibility, recognised expertise)
- Critical mass (sustainability)
- Centre of research (as referral point, management) - preferred
- impact (social economy, academic)

THRUST AREA

- *An area that the University would like to push*
- *An area of importance in the future*
- *Current thrust could be niche in the future*

Characteristics:-

- Emerging
- Potentially impactful research
- Innovative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Prof. Dr. Noorsaadah Abd Rahman
Deputy Vice-Chancellor (Research & Innovation)
Prof. Dr. Shaliza Ibrahim
Associate Vice-Chancellor (Research & Innovation)
Innovative Industry & Sustainability Science
Health & Well-Being
Frontiers of The Natural World
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Social Research Officer
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Senior Research Officer
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Administrative Assistant
Suryana Sukadi
Administrative Assistant

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- **Research Cluster Strategy**

Vision and Mission of UM Research Clusters

Vision

To be a platform for UM researchers in achieving research excellence for the betterment of the society

Mission

To foster impactful interdisciplinary research in niche and thrust areas

OBJECTIVES

1. Researchers' Empowerment:

To empower researchers to attain world class research attributes

2. Interdisciplinary Research:

To create an effective ecosystem for interdisciplinary research

3. Synergistic Partnership:

To create synergistic relationships with national and international partners

4. Research Communication:

To convey the success of research and researchers to wider community

STRATEGY

Objectives	Strategy
1. Researcher Empowerment	• Create awareness about interdisciplinary research and engagement with stakeholders • Develop & up skill researchers • Enhance researcher attributes
2. Interdisciplinary Research	• Scenario planning • Manage interdisciplinary research programs
3. Synergistic Partnerships	• Identify industrial research needs • Strengthen academia-industry relationships • Solicit research funding
4. Research Communication	• Increase researcher visibility • Increase visibility of research output

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PART 2: Impact Oriented Interdisciplinary Research

Outline

- Introduction to Research Impact
- Impact Pathways
- Engagement with Stakeholders/Research End-Users
- Research Communication
- Summary

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Academic impact

"The demonstrable contribution that excellent research makes to academic advances, across and within disciplines, including significant advances in understanding, methods, theory and application".

(Research Council UK)

Economic and societal impacts

"The demonstrable contribution that excellent research makes to society and the economy."

(Research Council UK)

Research impact

'The contribution that research makes to the economy, society and environment beyond the contribution to academic research'

(*Australian Research Council, 2016*)

Economic and societal impacts embrace all the extremely diverse ways in which research-related knowledge and skills benefit individuals, organisations and nations

Research impact is wide ranging

- Cultural impact
- Economic impact
- Environmental impact
- Social impact
- Impact on health and wellbeing
- Policy influence and change
- Legal impact
- Technological developments

Society gains from research might include

- Better products/processes
- Better services
- Healthier lives
- Better welfare
- Increased understanding of ideas and attitudes, values and beliefs
- …
- …
- …
- and so on
-

Examples of Impact

- Reducing Carbon emissions from cars
- Treating tumours without the need for surgery
- Influenced government policy on tax credits
- Changing army training programmes

Why does impact matter?

- **Accountability:** Public money for the benefits of society
- **Quality:** Improvement of research by engaging with beneficiaries
- **Maximising benefits:** Shortening time to benefits
- **Reputation:** Enhancement of attractiveness for research and innovation

Governments want to see a return on investments made in research

Questions as useful starting point

- Likely outcomes of this research?
- Who will benefit from this research?
- How will they benefit from this research?
- How can you involve potential beneficiaries in this research?
- How will you know if it has made a difference?

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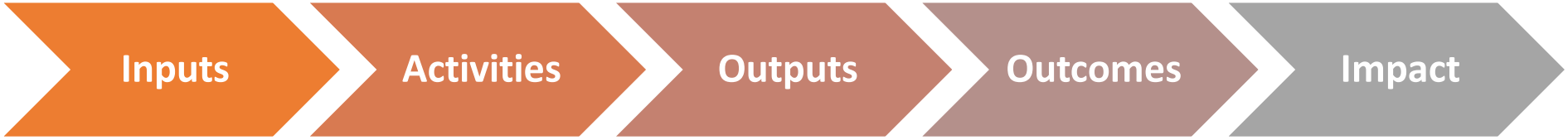
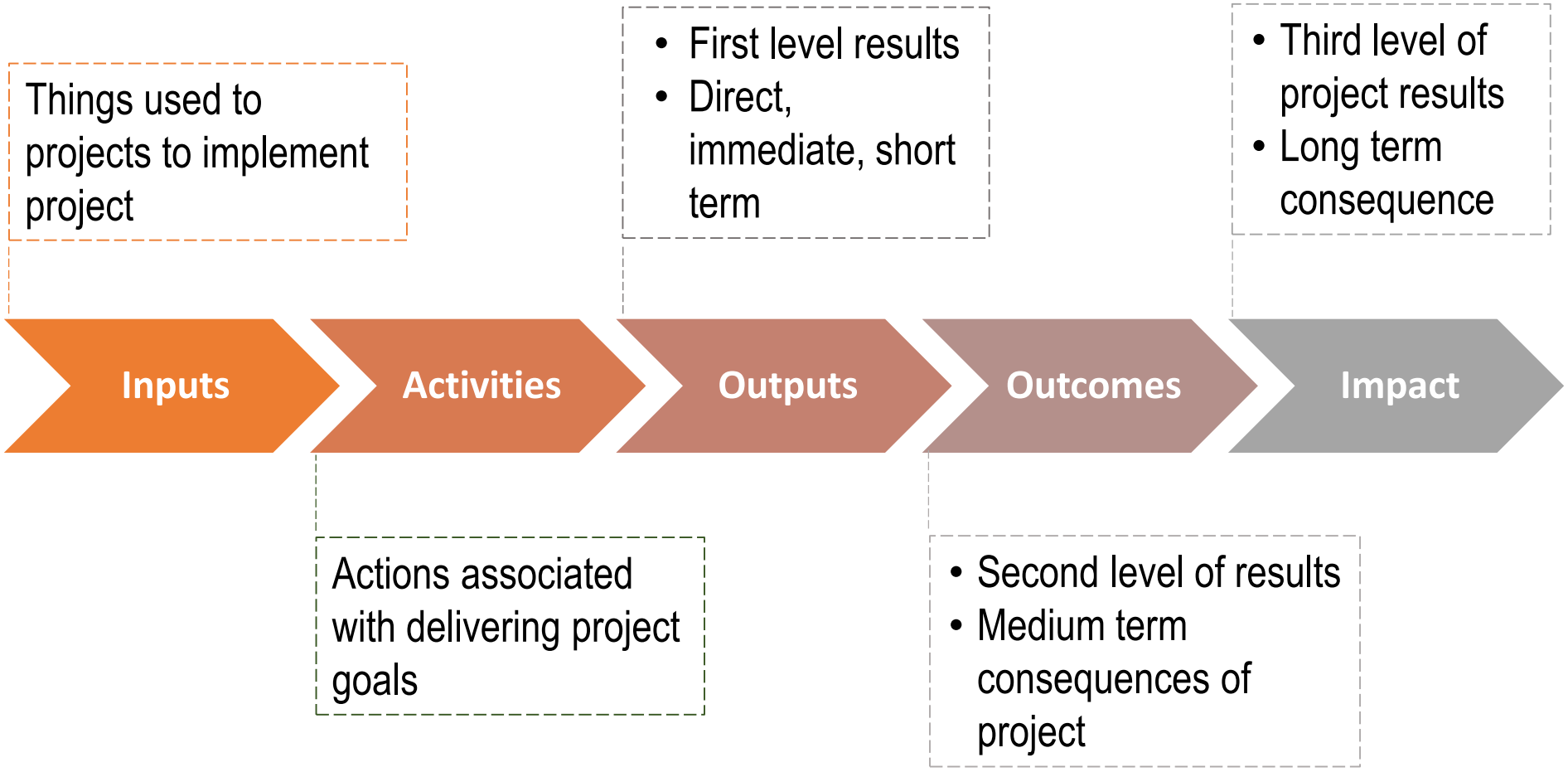
The Results Chain: Linear Model

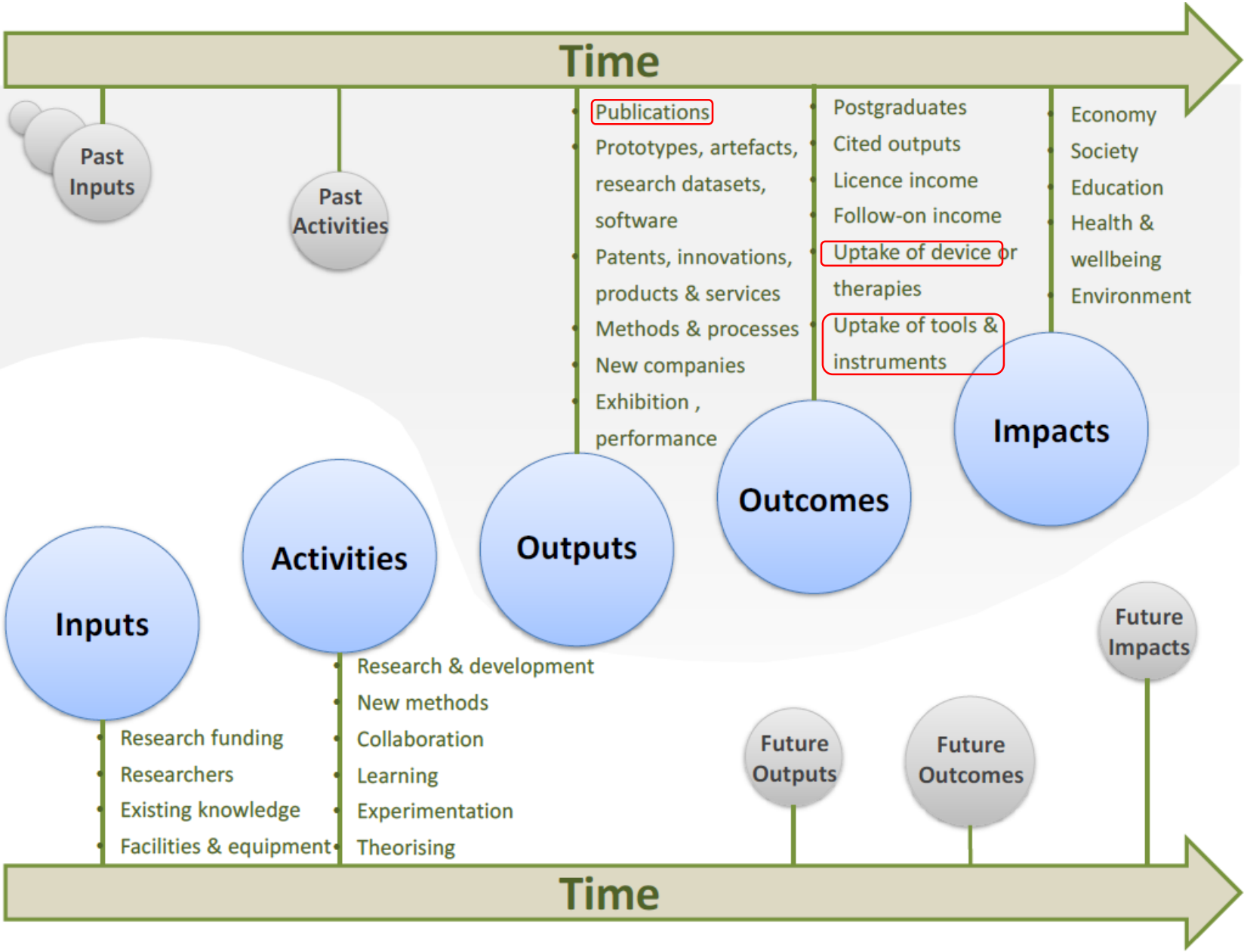


- **Varies across disciplines** – *is more or less tangible*
- **Takes time** – *but there may be intermediate outcomes on the way*
- **Evidence** – *need to monitor and collect evidence for every stage*

Modified from: Young et al. (2014)

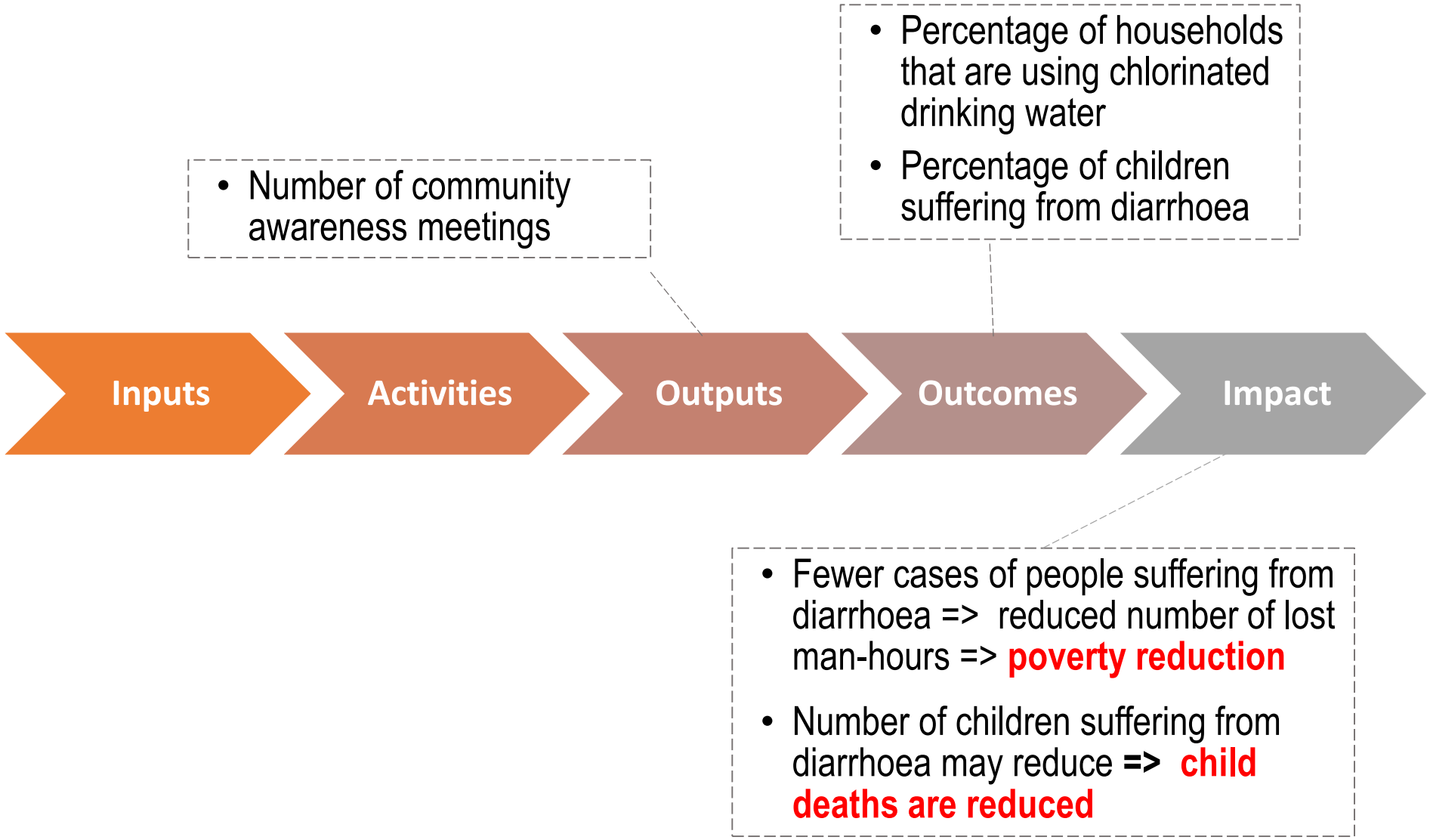

Things used to projects to implement project
• First level results
• Direct, immediate, short term
• Third level of project results
• Long term consequence
Inputs
Activities
Outputs
Outcomes
Impact
Actions associated with delivering project goals
• Second level of results
• Medium term consequences of project

Linkage of inputs, activities, outputs, outcomes & impacts over time



(*University College Dublin Report*)

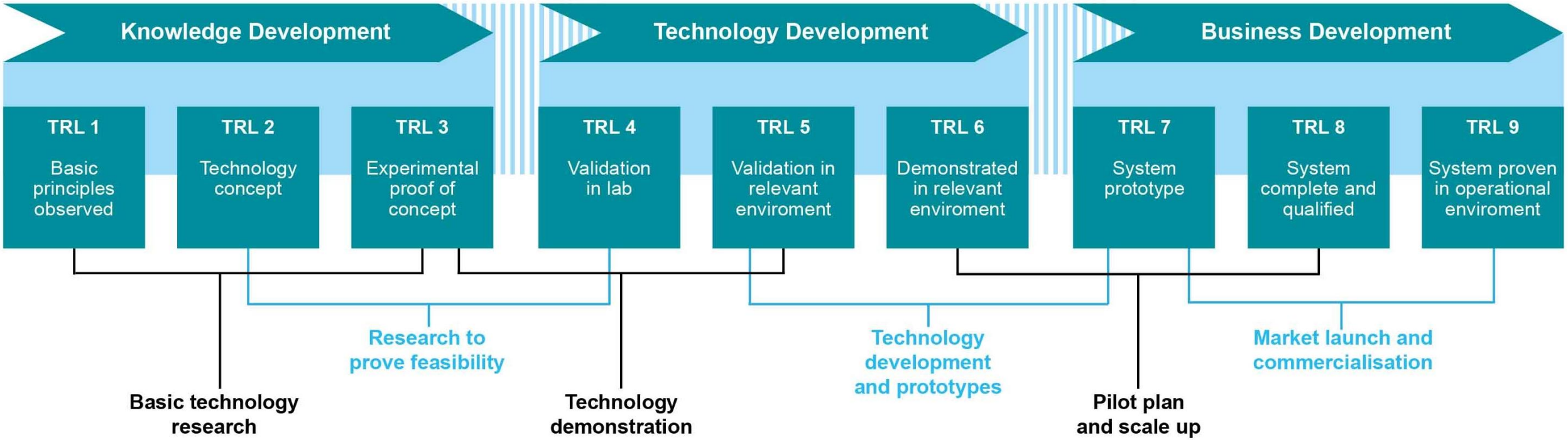
Example: Safe Water Project



Further Examples of Impact

- Wealth creation → spin-out company capitalisation, number of employees
- Environmental benefit → river now 10% cleaner than before
- Healthcare → 10,000 lives saved per year because of drug developed by research
- Social cohesion → policy developed in the research provides improved social networking among pensioners

Development pathway for new technologies:
Technology readiness levels (TRLs)



Questions to Consider

- What stage of development is your technology at?
- Where do you hope to progress your technology to during your project? What is a successful outcome
- If your project is successful who is most appropriate funder to support next stage of development?
- Will your project deliver all the evidence and prior planning required to produce a high quality application for next stage funding?

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Impact relies on key partnerships and two-way communication with external stakeholders / research end-users

Research Engagement

- Interaction between researchers and research end-users for the mutually beneficial exchange of knowledge, technologies and methods, and resources in a context of partnership and reciprocity
- Research end-users: include industry, Government, nongovernmental organisations, communities and community organisations

Outside of academia

Broad categories of research users may include

- General public/community/social enterprise groups
- Government and non-departmental public bodies (*ministers, civil servants, policy advisors/makers; regional, national, international*)
- Health care providers/agencies
- Charitable sector/NGOs Professional societies
- Private sector/industry (*large, small- and medium-sized enterprises [SMEs]*)
- Media partners (*collaboration with the media on feature stories, not press releases*)

- Engage with people outside academia → integrate best available knowledge on real life practices and get understanding on values, norms and preferences

- Joint framing of research problems, questions and co-production of knowledge among researchers and stakeholders

Co-Creation of Research Project

Co-Design of Research

- Identify and map stakeholders
- Joint framing of research problems, questions and end products

Co-Production of Research

- Consultation
- Collaboration

Impact Collaboration

- Dissemination
- Implementation of results

Include people from user organisations as co-investigators

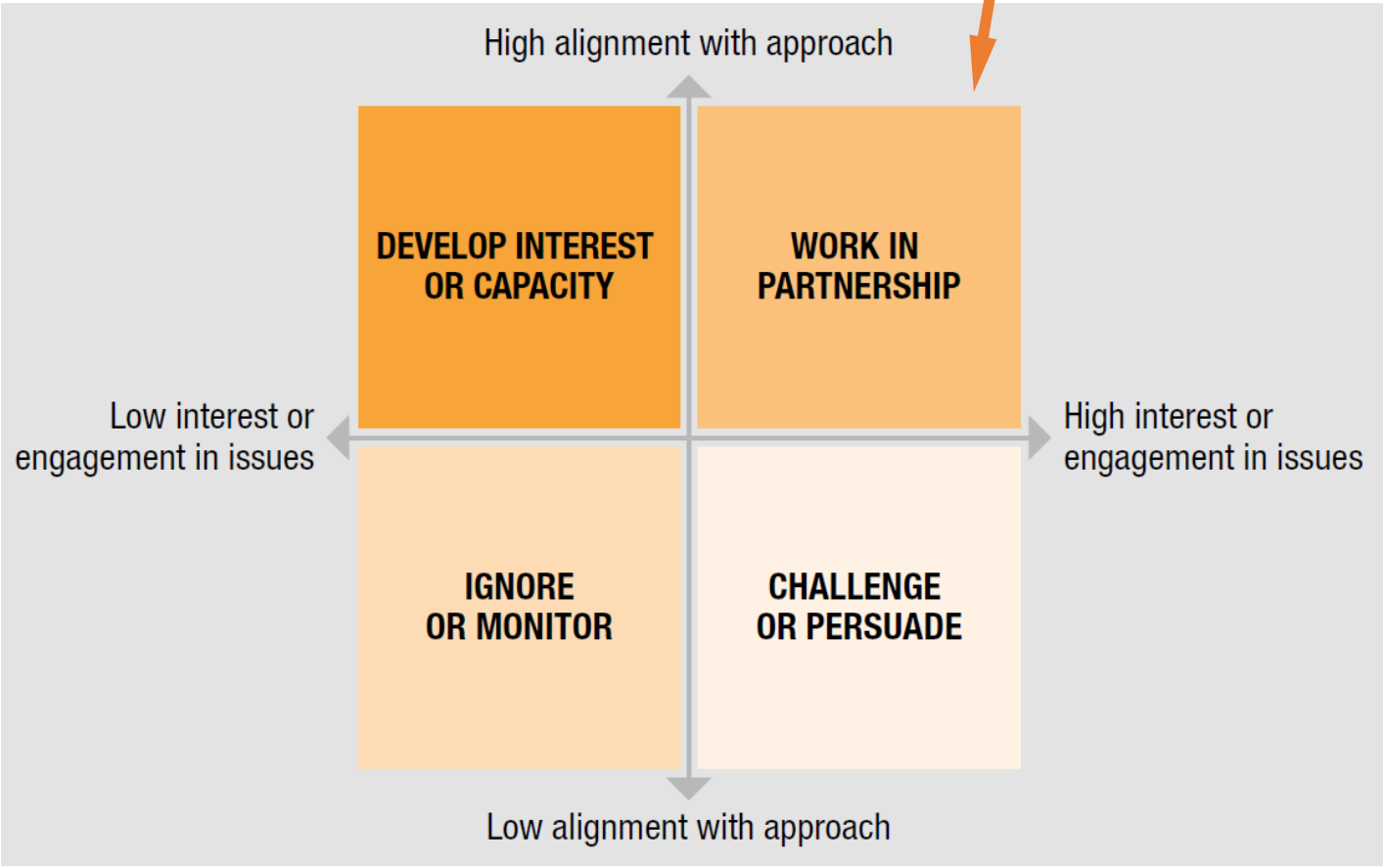
https://www.slideshare.net/DemosHelsinki/developping-a-transdisciplinary-research-project-a-case-study

Engagement indicators

- Co-supervision of students by research end-users
- Co-authorship of research outputs with research end-users
- Co-funding of research outputs with research end-users
- Joint patents granted

- Citations in patents to traditional research outputs
- In-kind support from end-users
- Cash support from end-users
- Research income / commercialisation income

Both interested in your issue and aligned with your approach



Source: Young et al. (2014)

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Research will only have real world impact if it reaches right people

- *who* you want to reach
- *what* you want to do
- *how* you want to reach them

Think about channels and tools you will use and to what messages they will relate

- Multi-way exchange of knowledge between academia and research users in business, public and third sectors
- ‘Engagement’ not just dissemination
- Do not leave it to the end
- Communications in the broadest sense – both formal and informal

- Workshops
- Bi-lateral meetings
- Public events
- Policy dialogues
- Field visits
- Online networks

- Media/press release
- Website
- Radio, TV broadcast
- Blogs
- Social media
- Emails

- Digital engagement
- Data visualization
- Multimedia

Summary

- Impact has to be built into project from the conceptual stage
- Research formulation together with industry/stakeholder
- Industry/stakeholders as research partners
- Demand driven research
- Expose researchers to impact pathways, innovation value chain, technology readiness level, path to commercialization

Meaningful engagement with stakeholders right from the beginning
+
interdisciplinary approach

"*People cannot foresee the future well enough to predict what's going to develop from basic research.* ***If we only did applied research, we would still be making better spears.***"

George Smoot
Lawrence Berkeley National Laboratory
2006 Nobel Prize for Physics

Thank you very much indeed !