Network Organizations:
Shared Vision, Implementation, and Funding

Patricia Dimanlig-Manuel, MD, PhD, MM

6th Philippine National Health Research System Week

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Overview

Cooperation in health R&D in ASEAN is premised on the following needs:

1. more accessible health products/services for poorer peoples
2. prepare for major pandemics
3. answer the MDG goals yet to be achieved

The ASEAN Network for Drugs, Diagnostics and Vaccines Innovation (ASEAN-NDI)

- A model to address these needs
- Special focus on:
  - Value Chain in R&D for cheaper drugs
  - Knowledge Management for scaling up
  - Public Goods concept for financial burden sharing

Adapted from Prof. Federico M. Macaranas (FMM), Asian Institute of Management, Presentation at IMDMDEVPro2012

Age-standardized mortality rates by cause (per 100 000 population) in ASEAN, 2008

	Communicable	Non-communicable	Injuries
Brunei Darussalam	55	520	24
Cambodia	478	748	65
Indonesia	244	647	70
Laos	376	771	107
Malaysia	185	526	51
Myanmar	461	667	347
Philippines	231	599	55
Singapore	66	313	21
Thailand	153	675	106
VietNam	122	607	66

Source: World Health Organization

The Next Pandemic

The World Bank estimated in 2008 that a pandemic with death rates similar to the Spanish flu of 1918-19 could shrink global GDP by 4.8%.

"Consumer spending declines; business investment plans are put off. Establishments including schools, sports stadia, clubs and restaurants are closed. Trade bans on imported meat are imposed. Workers call in sick. Working age deaths reduce potential output."

The Asian Development Bank fears that this next pandemic will come from Asia.

Source: FMM, Presentation at IMDMDEVPro2012

Achieving the ASEAN MDGs

In ASEAN, achieving the MDG 2015 is problematic for the slow progressing countries:

Under five mortality:
Brunei
Cambodia
Indonesia
Myanmar
Philippines

Maternal mortality:
Brunei
Cambodia
Indonesia
Laos
Malaysia
Myanmar
Philippines
Thailand

At least one antenatal care:
Cambodia
Laos
Myanmar
Philippines

Infant mortality:
Brunei
Cambodia
Indonesia
Myanmar
Philippines
Thailand
Vietnam

Incidence of malaria:
Thailand
Laos
Indonesia
Cambodia
Myanmar

15-49 Years w/ HIV:
Cambodia
Malaysia
Myanmar
Thailand

Birth attendance by skilled health personnel:
Cambodia
Laos
Myanmar
Philippines

"It's no longer sufficient, if you're a researcher, to know what somebody in your country is doing. You have to have a global watch."

Larry Starr

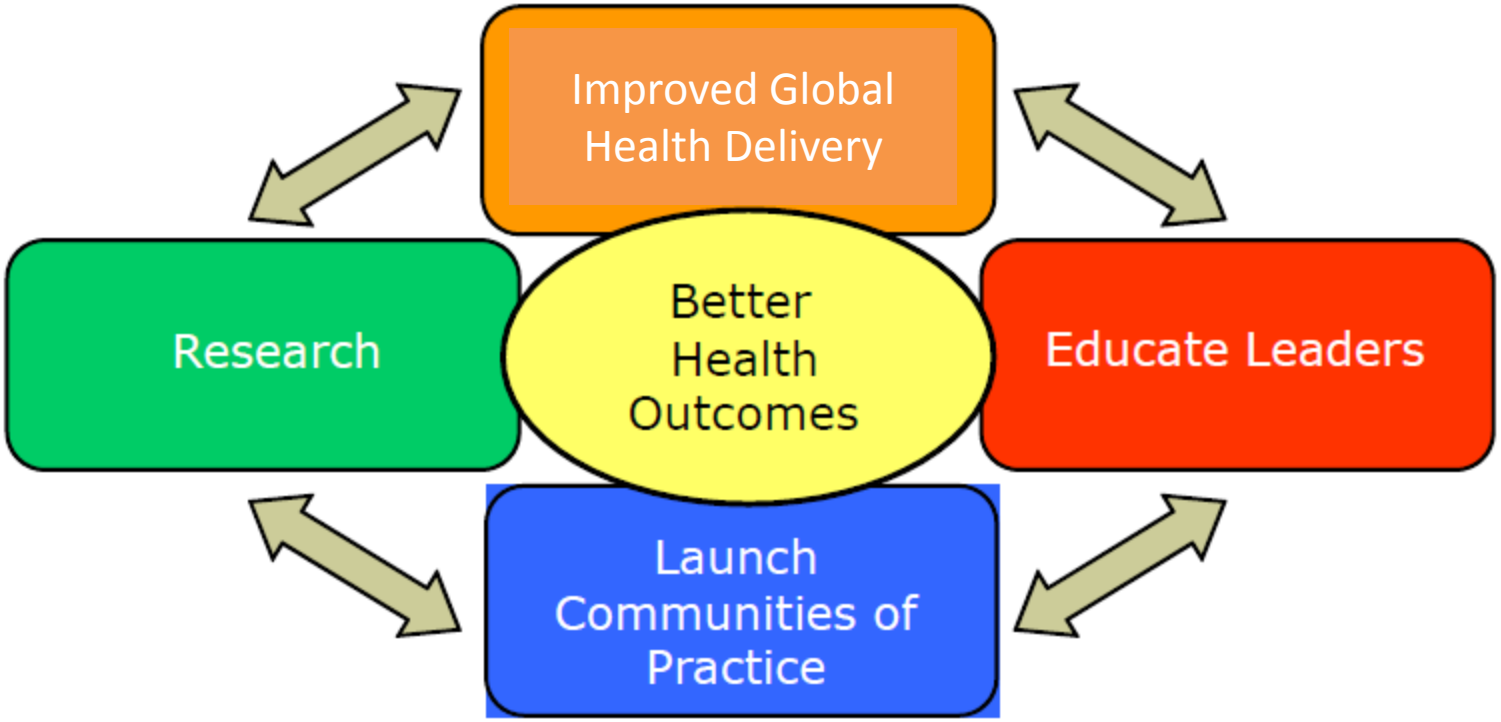
Founding Director of California Institute for Telecommunications and Information Technology (Calit2)

"Collaboration is speeding up the metabolism of research."

Jean-Claude Bradley

Head of Drexel University's antimalarial research program, and founder of UsefulChem network

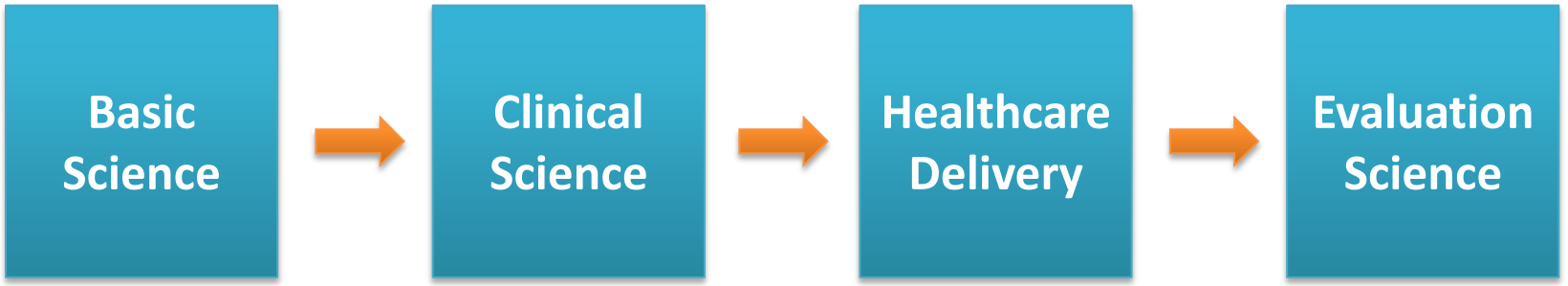
Collaborating for Better Health Outcomes



"Wikis"
a community that comes together to collaborate in order to achieve a common objective

Adapted from Porter and Weintraub "Global Health Delivery Project" (2008)

Health Research as a Value Chain



What is the pathophysiology?

What is the diagnosis and appropriate intervention?

How do we best deliver the intervention to everyone?

Does the intervention and delivery model work?

Collaboration is the key to efficiency

Adapted from Porter and Weintraub "Global Health Delivery Project" (2008)

Who Should Collaborate… And Why

GOVERNMENT	PRIVATE SECTOR	NGOs
Public policy	Access to capital	Community knowledge
Enforcement of rules	Technical knowledge	Volunteer Assets
State revenues	Commercial network	Leadership
Legality	Management skills	Values
Inflexible	Insensitive to others	Limited financing
Slow	Short term focus	Amateurish
Poor coordination	Numbers-driven	Narrow focus

Source: Noke Kiroyan, AFCSR 2006

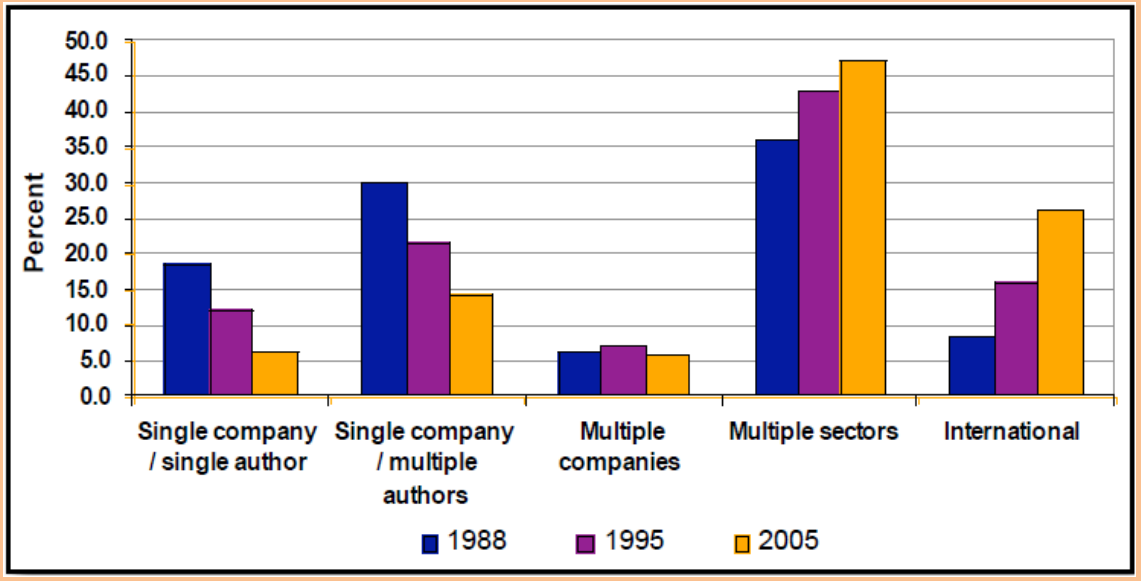
Collaboration will leverage strengths and address vulnerabilities

Adapted from Prof. Maya B. Herrera (2008), AIM

Collaboration in science is exploding

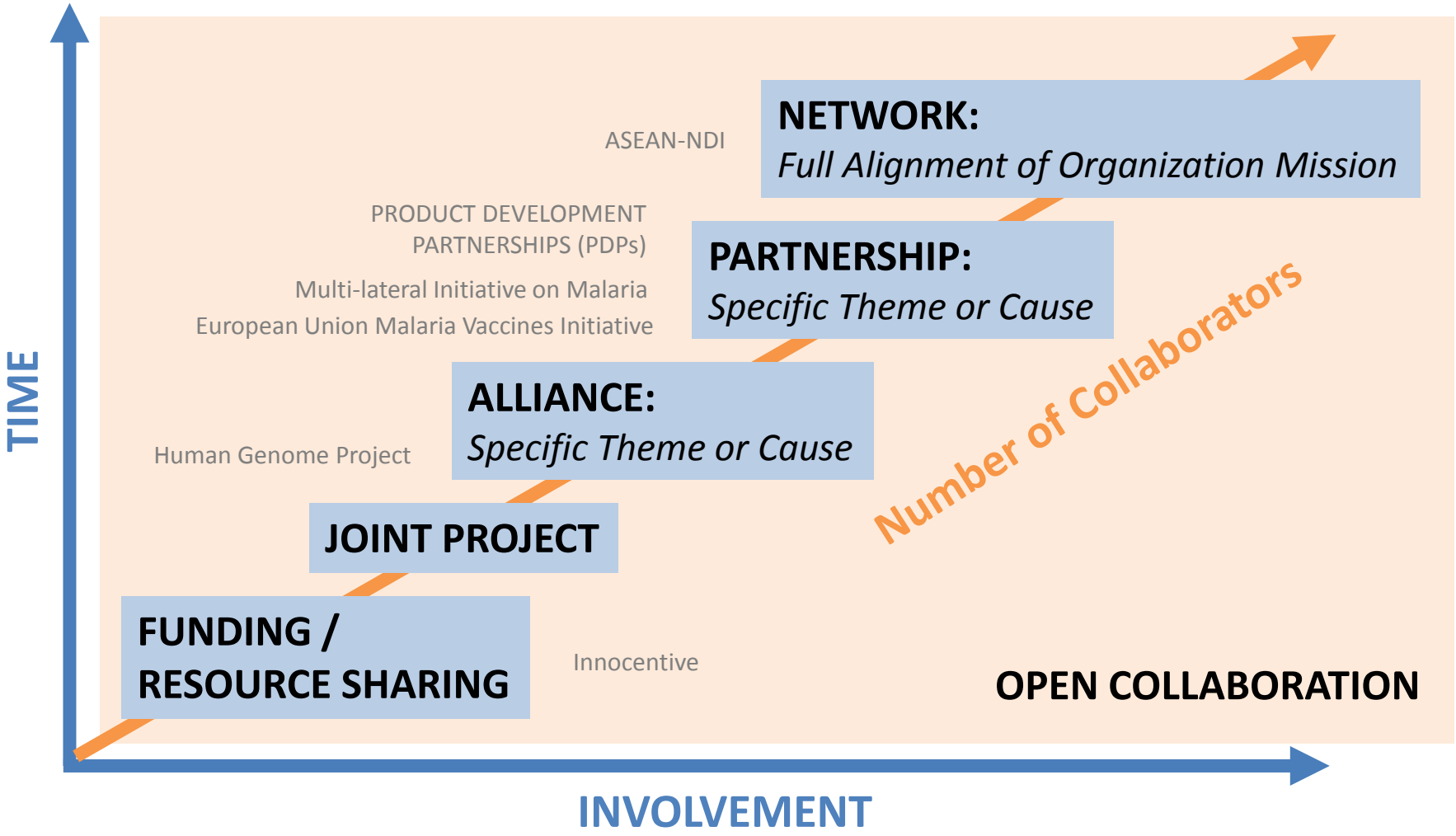
- The average number of authors per scientific paper has more than doubled
- 200-500 authors

S&E articles with industry authors, by institutional author types, (1988, 1995, and 2005)



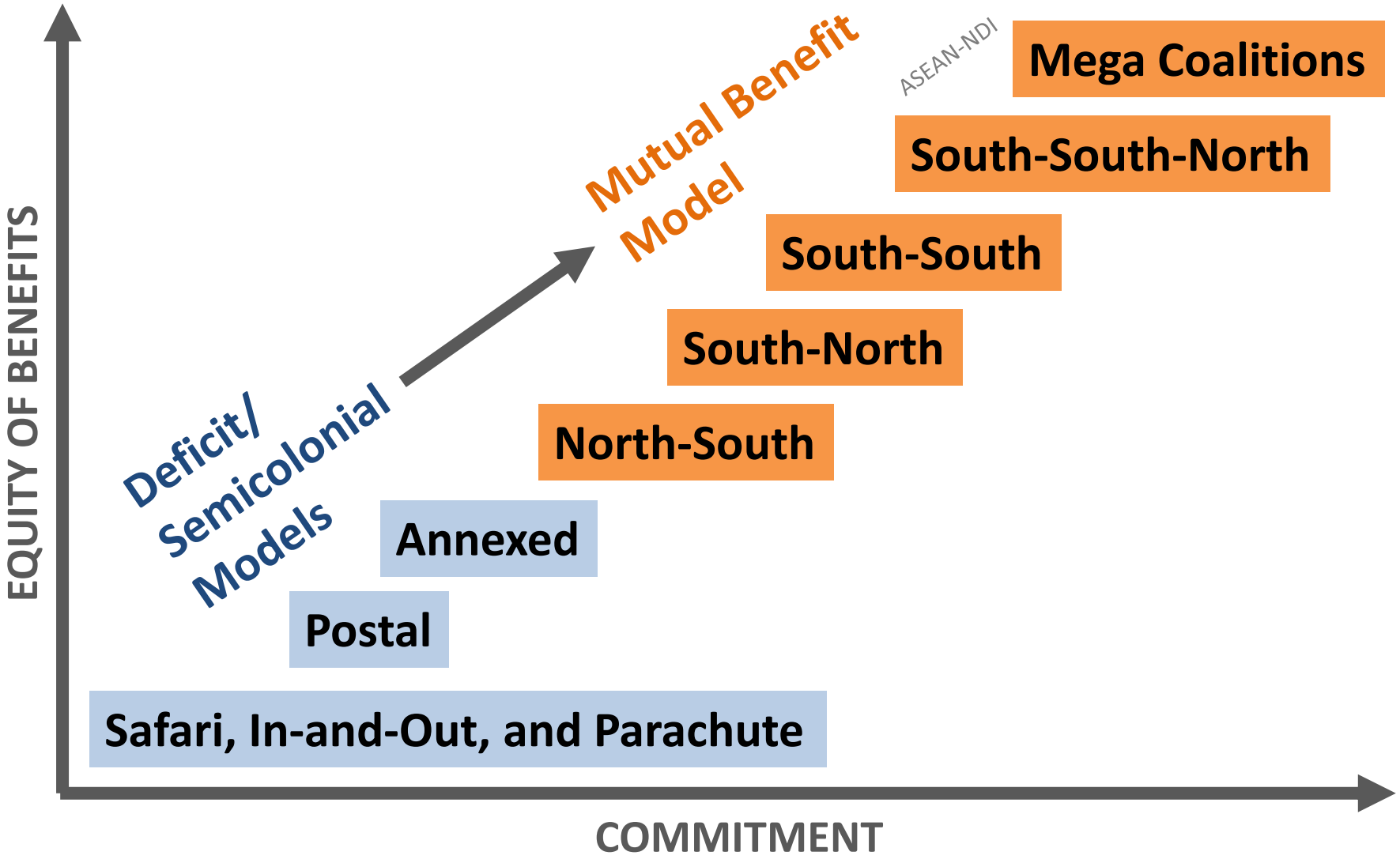
Source: NSF S&E Indicators 2008

Types of Collaboration



Adapted from Prof. Maya B. Herrera (2008), AIM

Models of Partnership in Global Health Research: A Development Perspective



Deficit vs Mutual Benefit Models

- **Deficit Model**:
  - Presumes that "the South" is deficient in knowledge/people/ capacity and that "the North" is able to provide technical assistance or 'know-how'
  - The goal of the partnership is the assistance from the North to the South

- **Mutual Benefit Model**:
  - Recognizes that a true collaborative arrangement provides a benefit to both parties
  - Partners recognize the unique contribution of each
  - Southern partners are recognized as having particular expertise to contribute to the partnership

"Building Respectful and Collaborative Partnerships for Global Health Research."
Canadian Coalition for Global Health Research

Deficit/Semicolonial Models

- **“Safari”, “In and Out” or “Parachute” research**

  Researchers from “the North” come to LMIC’s with their own research interests, obtain the specimens and data they want, then return to their labs and offices to write up their findings for publication

- **“Postal” model**

  Northern partners will have their Southern partners mail specimens to them

- **“Annexed sites”**

  Field research is led and managed by expatriate staff. While these sites have produced important research and trained some of the best researchers, they also represent a great drain on national health research institutions.

South-Canada Paper: South-Canada research partnerships for health and development. Working Paper prepared for the Canadian Coalition for Global Health Research (CCGHR), Ottawa.

North-South (N-S) Partnerships

- Main influence in the program (for example, the initial proposal, research design, or scientific and financial management) emanates from the northern partners.
- Examples: "annexed sites"

South-North (S-N) Partnerships

- Initiated by institutions or research groups in the South, or where southern partners are primarily responsible for the direction and management of the program or project. Inputs from "the North" are mainly technical and advisory.
- Partnership may have clear mutual benefit for both southern and northern partners.

"Building Respectful and Collaborative Partnerships for Global Health Research."
Canadian Coalition for Global Health Research

South-South (S-S) Partnerships

- Initiated, conceived and organized by southern partners
- Work jointly on common problems, share expertise and experience, or to work jointly to interface northern or international partners from a position of equality.
- Southern partners pool resources and therefore create a robust partnership model with joint ownership.

South-South-North (S-S-N) Partnerships

- S-S Partnerships may evolve into this model
- Initiated jointly by Southern partners or a mix of Southern and Northern partners
- No sense of hierarchy / partnership of equals
- May require partners to break out of the "South/North" descriptive paradigm to foster an equal collaboration

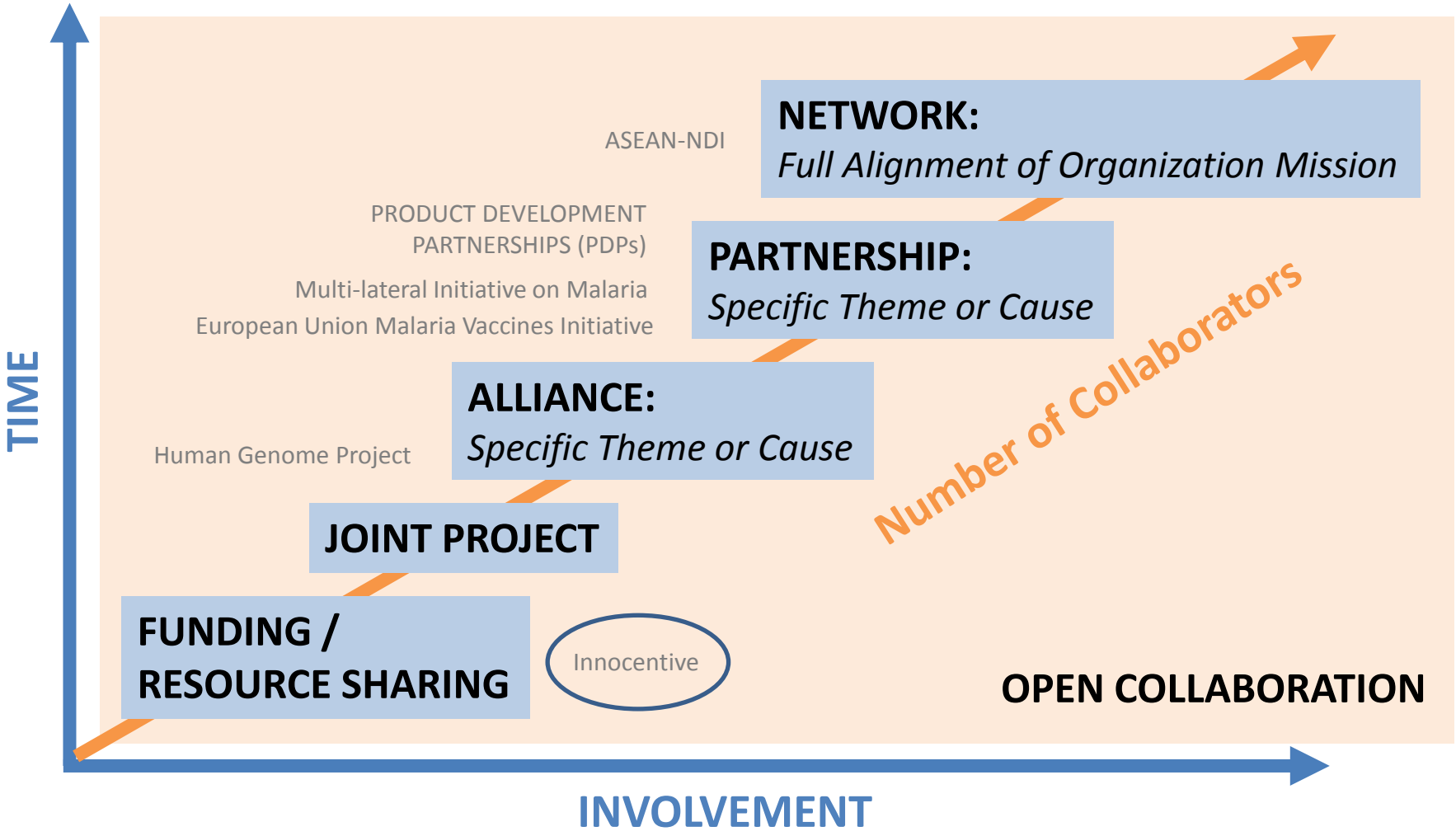
"Building Respectful and Collaborative Partnerships for Global Health Research."
Canadian Coalition for Global Health Research

Mega Coalitions and Initiatives

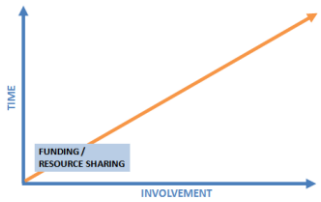
- Increasingly common arrangements
- More complex, typically involving several northern and southern institutions
- Focused on a specific problem or issue
- Examples:
    - Multi-lateral Initiative on Malaria (MIM)
    - European Union Malaria Vaccines Initiative
- Typically well-funded (i.e. through the Melinda and Bill Gates Foundation)

"Building Respectful and Collaborative Partnerships for Global Health Research."
Canadian Coalition for Global Health Research

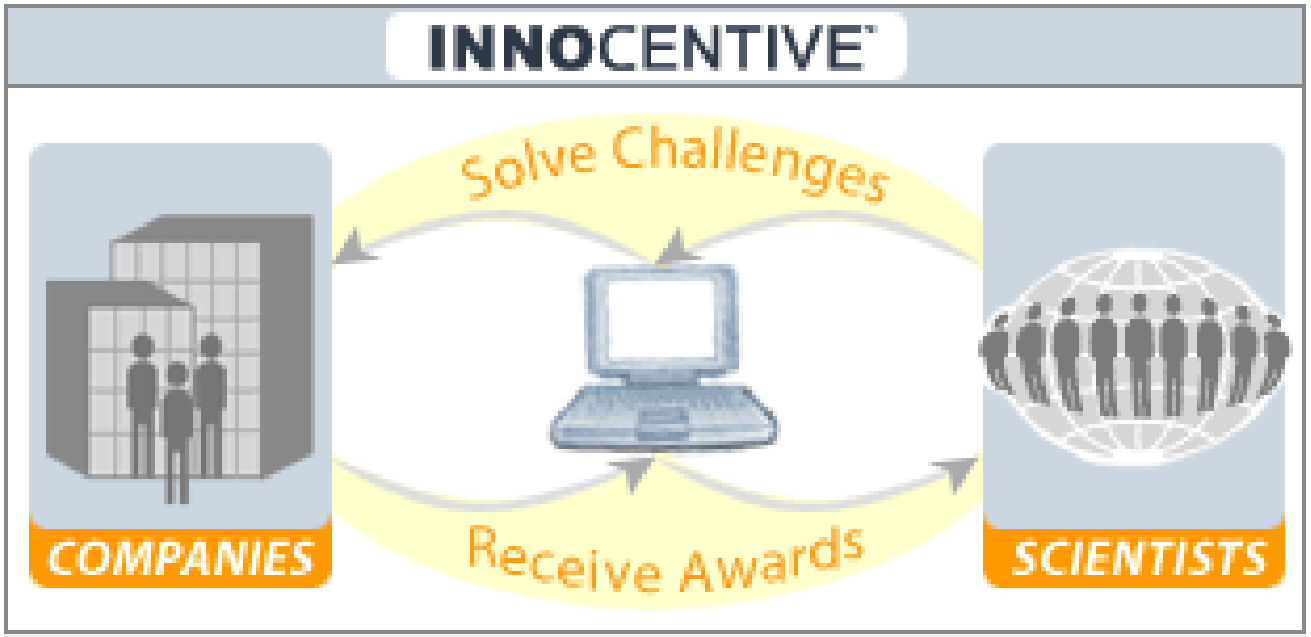
Types of Collaboration



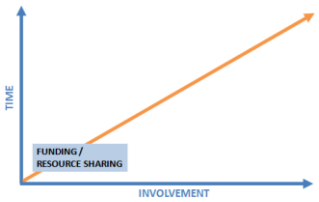
Adapted from Prof. Maya B. Herrera (2008), AIM



Open Innovation: The InnoCentive Approach



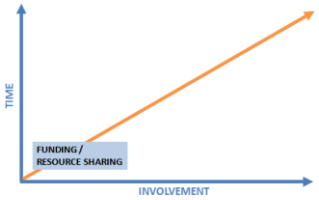
Companies contract with InnoCentive as "Seekers" to post R&D challenges. Scientists register as "Solvers" to review challenges and submit solutions online. The Seeker company reviews submissions and selects the best solution. InnoCentive issues the award amount to the winning scientist/Solver.



InnoCentive:
A New Funding Model for Research

TRADITIONAL FUNDING MODEL	FUNDING 2.0
RFP by government agencies	Open market by funding bodies
Promote national science objectives and national research institutions	Maximize funding dollars by sourcing scientific ideas and talent on a global basis
Compete	Collaborate
Priority based on nationality, seniority, or star status	Rewards most qualified
Private/Closed	Transparent/Open
Publish in journals	Open Access

Adapted from Tapscott and Williams (2010). Macrowikinomics: Rebooting Business and the World.



InnoCentive: By the Numbers

- **Year Founded:** 2001
- **Total Registered Solvers:** More than 260,000 from nearly 200 countries
- **Total Solver Reach:** 12+ million through their strategic partners (e.g., Nature Publishing Group, *Popular Science*, *The Economist*)
- **Total Challenges Posted:** 1,450+ External Challenges & hundreds of Internal Challenges (employee-facing)
- **Project Rooms Opened to Date:** 420,000+
- **Total Solution Submissions:** 31,000+
- **Total Awards Given:** 1,215+
- **Total Award Dollars Posted:** $35+ million
- **Range of awards:** $500 to $1+ million based on the complexity of the problem and nature of the Challenge
- **Average Success Rate:** 57%

(Current as of June 14, 2012)

Lessons from InnoCentive

1. The more diverse the scientific interests of the solvers attracted to the problem, the more likely the problem was to be solved

2. The further the problem was from the solvers' research area, the more likely they were to solve it.

Open collaboration can solve seemingly insurmountable R&D challenges

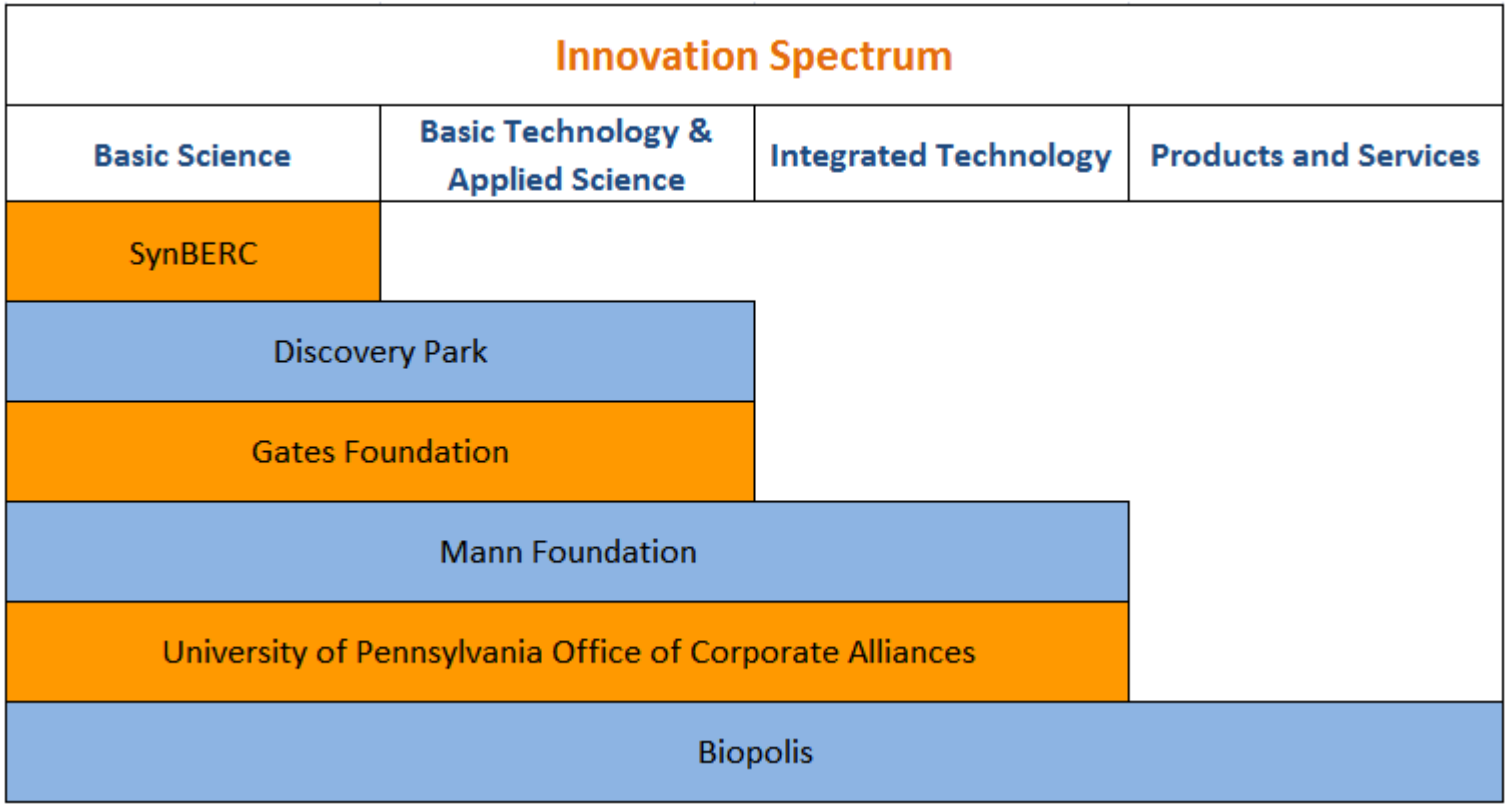
Source: Study by Dr. Karim R. *Lakhani*, Professor at Harvard Business School

Swiss Model:
Eleven Principles for Partnership

- Decide on the objectives together
- Build up mutual trust
- Share information; develop networks
- Share responsibility
- Create transparency
- Monitor and evaluate the collaboration
- Disseminate the results
- Apply the results
- Share profits equitably
- Increase research capacity
- Build on the achievements

Guidelines for Research in Partnership with Developing Countries: 11 Principles.
Swiss Commission for Research Partnership with Developing Countries (KFPE). 1998

Organizations that Promote Partnership and Innovation



Adapted from "University-Private Sector Research Partnerships in the Innovation Ecosystem", November 2008. Report of the President's Council of Advisors on Science and Technology (USA).

Features that Promote Innovation

	Develops Strategic Partnerships	Utilizes a Consortia Model	Substantially Leverages Government Funding	Focus on Open Collabo-ration	Provides Flexible or Novel Approaches for Technology Transfer	Links R&D, Education, Entrepre-neurship, and/or Innovation	Establishes Clusters to Promote Innovation
Biopolis	x	x	x		x	x	x
Discovery Park			x		x	x	x
Gates Foundation			x				
Mann Foundation		x					
SynBERC	x	x	x			x	
UPenn OCA	x				x		

Adapted from "University-Private Sector Research Partnerships in the Innovation Ecosystem", November 2008. Report of the President's Council of Advisors on Science and Technology (USA).

Biopolis

OVERVIEW	• An **international biomedical sciences R&D center** located in Singapore; launched 2003 • Singapore's Agency for Science, Technology and Research (A*STAR) Biomedical Research Council (BMRC) supports, oversees and coordinates public sector biomedical R&D activities • **Provides space and shared equipment** for biomedical R&D activities, and **promotes peer review and collaboration** among the private and public scientific community • Over 2,000 scientists, researchers, technicians and administrators live and work here
GOALS	• Works in close partnership with the Ministry of Health in the national effort to **drive translational and clinical research** to bring scientific discoveries from the bench to the bedside, and ultimately **improve human health** and healthcare delivery
INSTITUTIONS & PARTNERS INVOLVED	• Key Singapore government agencies • Publicly-funded research institutes • R&D labs of pharmaceutical and biotech companies
FUNDING	Developed and completed by SG government at a cost of $500 million.
TECHNOLOGY TRANSFER APPROACH	• A*STAR's strategic marketing and commercialization arm, ETPL, manages and consolidates the IP of A*STAR's research institutes • Enhances the research output of its scientists by translating their inventions into marketable products or processes through licensing deals and spin-offs with industry partners
CAPACITY BUILDING	• A*STAR Graduate Academy (A*GA) promotes science scholarships and other manpower development programs and initiatives • Aims to train 1,000 Singaporean PhD candidates by 2015 • Provides awards to top local and foreign talent

WHO Functions / Attributes of a Well-Functioning Health Research System

- Stewardship Function
  - Define and articulate a vision for a national health research system
  - Identify appropriate health research priorities and coordinate adherence to them
  - Set and monitor ethical standards for health research and research partnerships
  - Monitor and evaluate the health research system
- Financing Function
  - Secure research funds and allocate them accountably
- Creating & Sustaining Resources
  - Build, strengthen and sustain the human and physical capacity to conduct and absorb health research
- Producing & Using Research
  - Produce scientifically validated research outputs
  - Translate and communicate research to inform health policy, health practice, and public opinion
  - Promote the use of research to develop drugs, vaccines, devices and other applications to improve health

http://www.who.int/rpc/health_research/concepts/en/index.html

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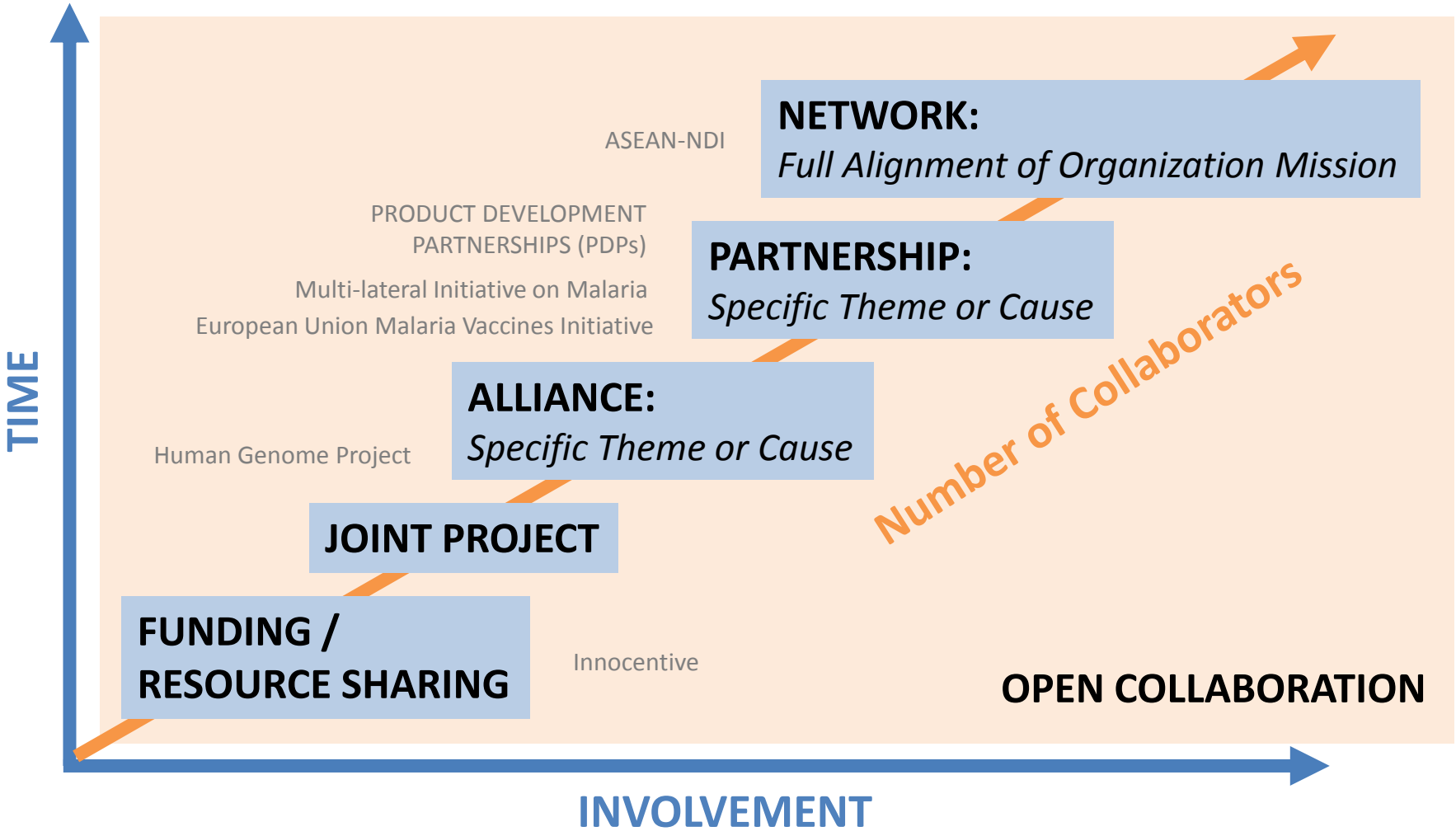
Biopolis	x	x	x		x	x	x
Discovery Park			x		x	x	x
Gates Foundation			x				
Mann Foundation		x					
SynBERC	x	x	x			x	
UPenn OCA	x				x		
ASEAN-NDI	x	x	x	x	x	x	x

Adapted from "University-Private Sector Research Partnerships in the Innovation Ecosystem", November 2008. Report of the President's Council of Advisors on Science and Technology (USA).

What is Open Collaboration?

- aka Open Innovation
- Development projects in which multiple participants collaborate and openly share what they develop
- Individuals and entire regions of the globe that would historically never interact can now collaborate on a research project in real-time
- Open collaborative innovation projects can be at a larger scale than any single user can undertake alone

Open Collaboration is made possible by IT-mediated technologies



R&D : Digital Collaboration

The interconnected digital age brings in vast opportunities for collaboration through open-source systems to solve some of these problems.

Wikis can provide shared space for group learning, discussion and collaboration from the drug discovery process, to coordinated and comprehensive attack of intractable diseases, to clinical trials open to broader community of researchers, etc.

Source: FMM, Presentation at IMDMDEVPro2012

Open-source collaboration

- Open-source biology has become a reality in antimalarial research at Drexel University where a synthetic organic chemist is able to work through UsefulChem, a large network of scientists with complementary skills and knowledge that share in real-time information that otherwise would take years via conventional publishing.
- Similarly, GlaxoSmithKline has pledged cheaper medicines for the developing world through "patent pools" where information on relevant chemicals and processes are placed openly for use by other researchers.
- MIT's International Genetically Engineered Machines Competition, set up in 2004, standardized parts and operate them in living cells Some 8,000 "BioBricks" are hosted by MIT in a registry of the organic fabrications.
- FluWikie.com was set up during the 2009 H1N1 flu pandemic with comprehensive information that no single government agency alone could put up. The site has specific information on the swine flu in Brunei and Vietnam, H1N1 virus in Indonesia, miscellaneous articles from the Philippines, Laos, Myanmar, etc., among others.

Source: FMM, Presentation at IMDMDEVPro2012

Other Virtual R&D Networks

Other examples demonstrate the potential of virtual R&D networks:

- **Product Development Partnerships** in malaria, tuberculosis, neglected diseases
- **BIOtechNOW** is a multiblog platform and monthly newsletter that is directed at the online community in biotechnology for discussion of the latest news in the industry
- **HealthSpace.Asia** is a social platform facilitating collaboration in regional health across existing networks, policy makers and researchers with interest in health policy and research.
- **Open Data Drives –** UK's Power of Information Task Force, recommended that all public agencies in the UK create online innovation spaces where the general public and staff can co-create information-based public services, e.g. Amazon, Flickr, and Apple.

Source: FMM, Presentation at IMDMDEVPro2012

Product Development Partnerships

Product development partnerships (PDPs) focusing on drugs

1) Institute of One World Health (http://www.iowh.org/)
2) Medicines for Malaria Venture (http://www.mmv.org/)
3) Drugs for Neglected Diseases Initiative (http://www.dndi.org/)
4) Global Alliance for TB Drug Development (http://tballiance.org/)

Description

Type of organization: not-for-profit

Operating model: virtual R&D

Approach: building partnership with pharmaceutical industry, biotechnology companies, and academic institutions; utilizing portfolio management approach

Funding: philanthropy, governments, etc.

Location: mainly in developed countries

Capacity building: limited

Source: FMM, Presentation at IMDMDEVPro2012

Partnerships of biotech firms in neglected diseases

- SMEs in biotech are now fostering innovation in neglected disease R&D such as malaria, tuberculosis, dengue fever, etc., actively partnering with government agencies in product development partnerships (PDPs).
- Across all neglected diseases, biotech firms work alone only 36% of the time, esp. TB and dengue (perceive potential market opportunities).
- Involved in PDPs and other partnerships with academic institutions in the other 64% of all products in the development pipeline for drugs, vaccines and diagnostics for neglected diseases.

"Biotechnology: Bringing Innovation to Neglected Disease Research and Development."
http://finance.yahoo.com/news/report-finds-biotechnology-companies-participating-152600690.html

COLLABORATION IN HEALTH R&D

1. can lower costs
2. can accelerate production of health products and services

High costs of R&D for drug development

The enormous funding needed for R&D is suggested by:

- Tapscott and Williams who report that "a typical new drug takes ten to fifteen years and an average of $800 million to develop,"
- Donlon who notes that "bringing a drug to market (from discovery and development to clinical trials and government approval) costs, on average, approximately $1 billion and takes anywhere from 7.5 to 11 years."
- This has dramatically increased from the Tufts University $200 million cost estimate for developing new pharmaceutical products (prescription drugs) in the 1980's, which Besanko, et.al., re-estimated at $400 million , numbers that show that the average fixed costs of prescription drugs vary widely with the sales volume.

Barnaby S. Donlon, Strategy Execution in the Pharmaceutical and Life Sciences Industries," Balanced Scorecard Report, July-August 2010, Vol. 12, No.4, pp. 10-13.
Source: FMM, Presentation at IMDMDEVPro2012

WHO: delink costs of R&D from drug prices

WHO experts reviewed the evidence on health R&D relevant to developing countries, beginning with the pioneering work of the Commission on Health Research and Development (CHRD) in 1990 and subsequent estimates by the 1996 Ad Hoc Committee on Health Research, the Global Forum on Health Research, and latter the estimates produced by G-Finder.

WHO also reviewed the evidence relating to new product development in the last decade, including products developed by public−private partnerships for product development. WHO noted the importance of linking research strategies to access considerations and, in that context, the relevance of delinking the costs of R&D from the price of products.

Source: FMM, Presentation at IMDMDEVPro2012

Cooperation in R&D Can Lower Costs

Krisana Kraisintu:

Lower costs of HIV/AIDS drugs in Thailand and Africa

- Developed the world's first generic antiretroviral (ARV) drug at ¼ the cost of the branded product
- **Working with NGO** advocates lobbying for lower consumer prices, she weathered major legal battles to produce the second generic ARV drug ddI (didanosine); still later she and her team invented a "cocktail" drug known as GPO-VIR, which is 18x cheaper than the regimens of multiple pills taken by AIDS patients
- GPO in 2010 produced seven types of ARVs, with production sufficient to treat 150,000 patients a year in Thailand, Cambodia, Laos, and Vietnam
- Brought her expertise to 15 African countries, helping them to locally manufacture affordable medicines

Source: FMM, Presentation at IMDMDEVPro2012

WHO Review of Trends in the Pharmaceutical Industry

- Fall in the approval of new drugs, including those with new therapeutic effect
- R&D expenditures have continued to rise and many existing top-selling medicines are going out of patent
- the pharmaceutical industry response:
  - mergers and acquisitions,
  - greater focus on emerging markets
  - search for **new and better models of innovation**
    - "open innovation" involving more **open collaboration** with external partners
    - Breaking down the steps in the drug development value chain: **outsourcing**

Source: FMM, Presentation at IMDMDEVPro2012

Breaking Down the Steps in the Drug Discovery Value Chain: Outsourcing

The drug discovery value chain in fully integrated pharmaceutical corporation or FIPCO has changed as major pharmaceutical firms now outsource a number of their functions, e.g., Pfizer and Eli Lilly. FIPCOs have unbundled their three core businesses into *product innovation, infrastructure*, and customer relationship.

- Biotech firms have taken over the product innovation business, with specialist firms focusing on developing technologies that speed the drug discovery process for pharmaceutical firms.
- Pharma firms have also outsourced their infrastructure to contract research organizations (CROs) for the clinical testing phase. Such unbundling of services have made it possible for companies to specialize in a particular field, enabling them to respond more quickly to changing opportunities.
- Pharma firms however maintained the customer relationship business in the life-science industry including the marketing and selling of drugs.

Source: John Hagel and Marc Singer, "Unbundling the Corporation," The McKinsey Quarterly, 3, 2000 , cited in Besanko, et. al.

African Network for Drugs and Diagnostics Innovation (ANDI)

- Launched 2008
- Goal: “To promote and sustain African-led product R&D innovation through the discovery, development and delivery of affordable new tools, including those based on traditional medicines”
- Vision: "Creating a sustainable platform for R&D innovation in Africa to address Africa’s own health needs"
- Will also support capacity and infrastructural development

In 2011, ANDI established 32 Centres of Excellence in Health Innovation

Source: http://www.andi-africa.org/index.php/strategic-plan

ASEAN Network for Drugs, Vaccines, and Diagnostics Innovation (ASEAN-NDI)

Clinical Trials in ASEAN

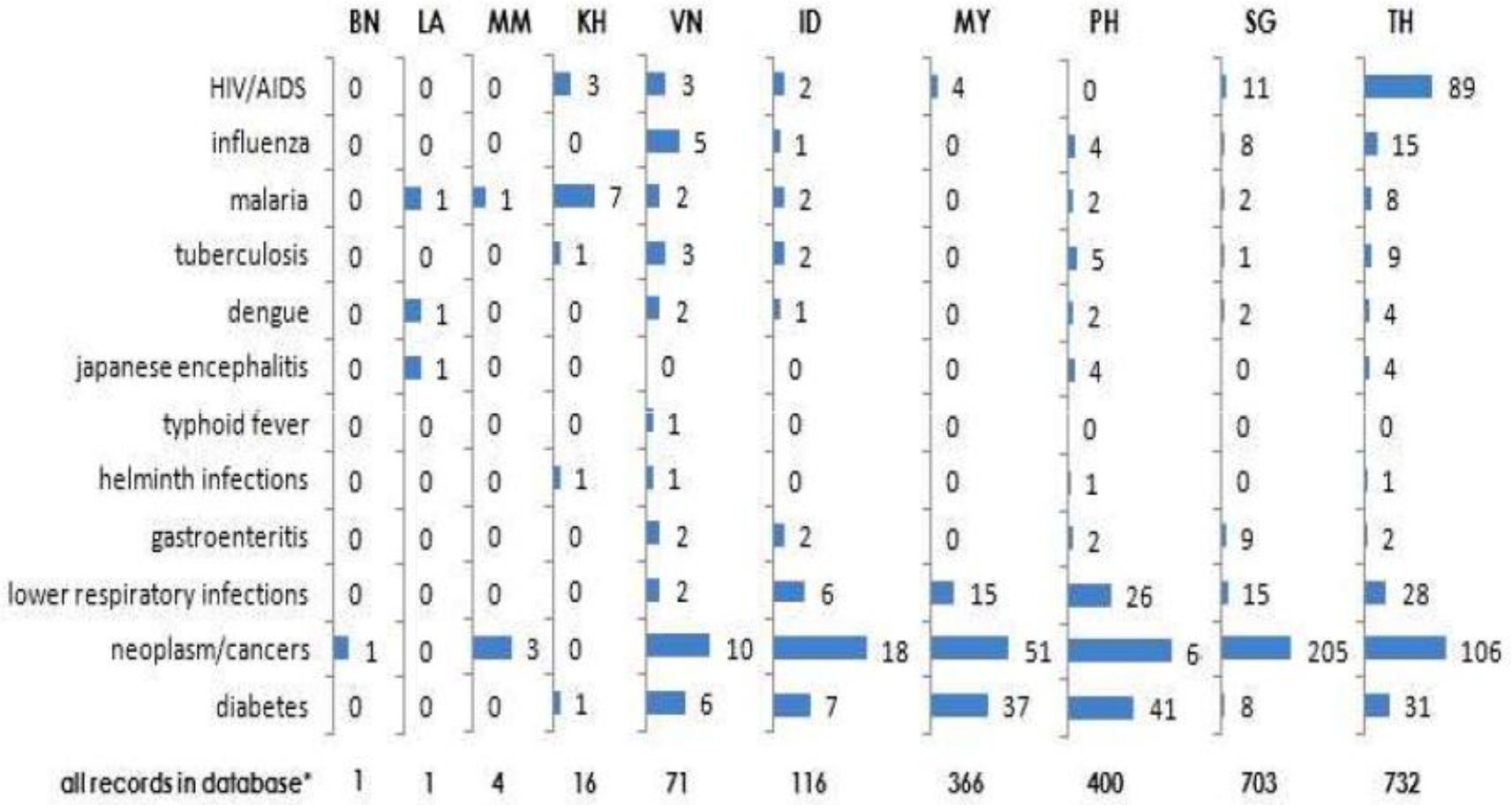
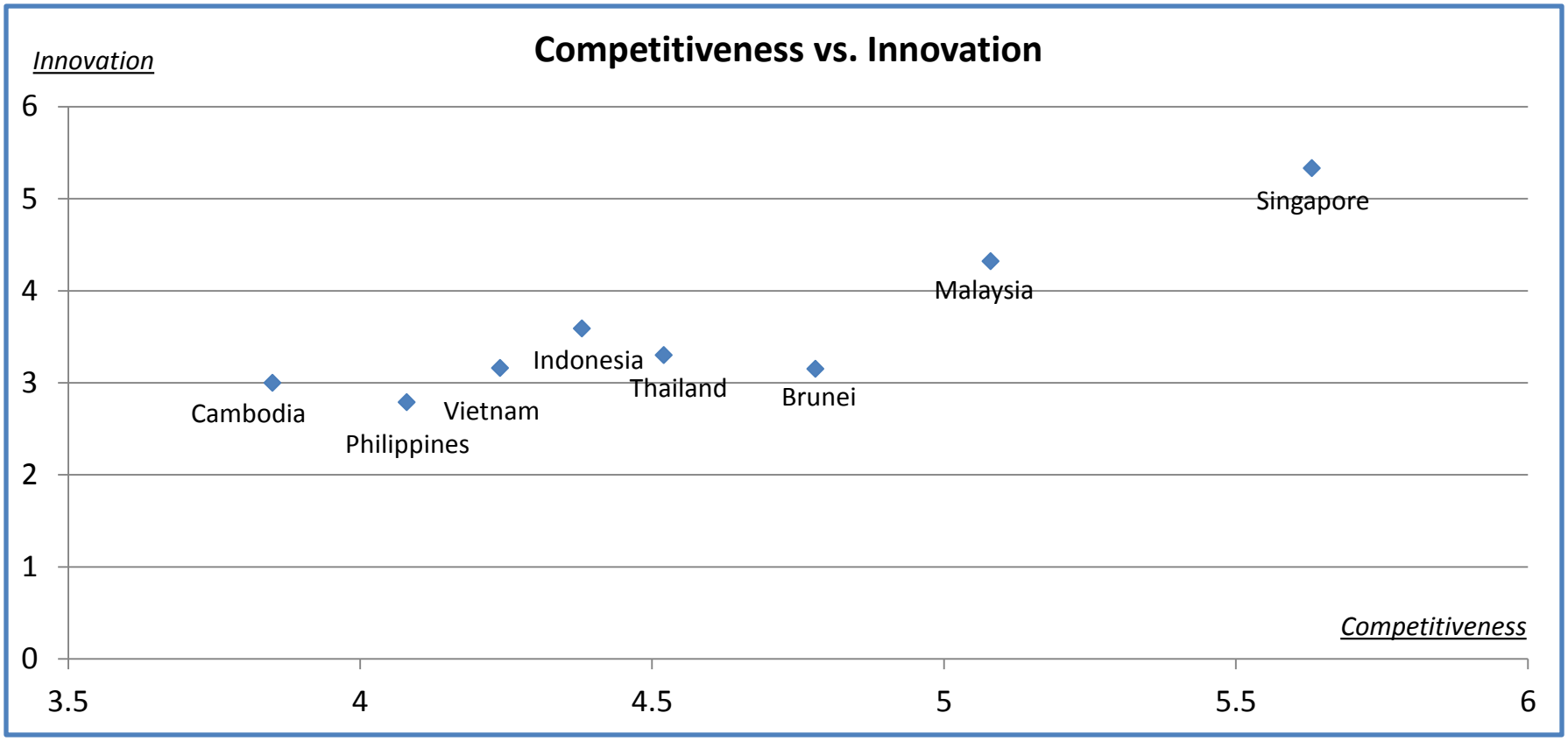


Figure. Most clinical trials in the ASEAN region are focused on maladies and conditions other than tropical infectious diseases. Only trials which are currently "open" or "recently completed" in the clinicaltrials.gov database (as of July 2010) were counted.

*ClinicalTrials.gov. Data on numbers of clinical trials per country. Retrieved from http://clinicaltrials.gov/. Accessed July 2010.

Reported by Jaime Montoya, Mapping Activity for the Establishment of the ASEAN Network for Drugs and Diagnostics Innovation (ASEAN – NDI), 2010.



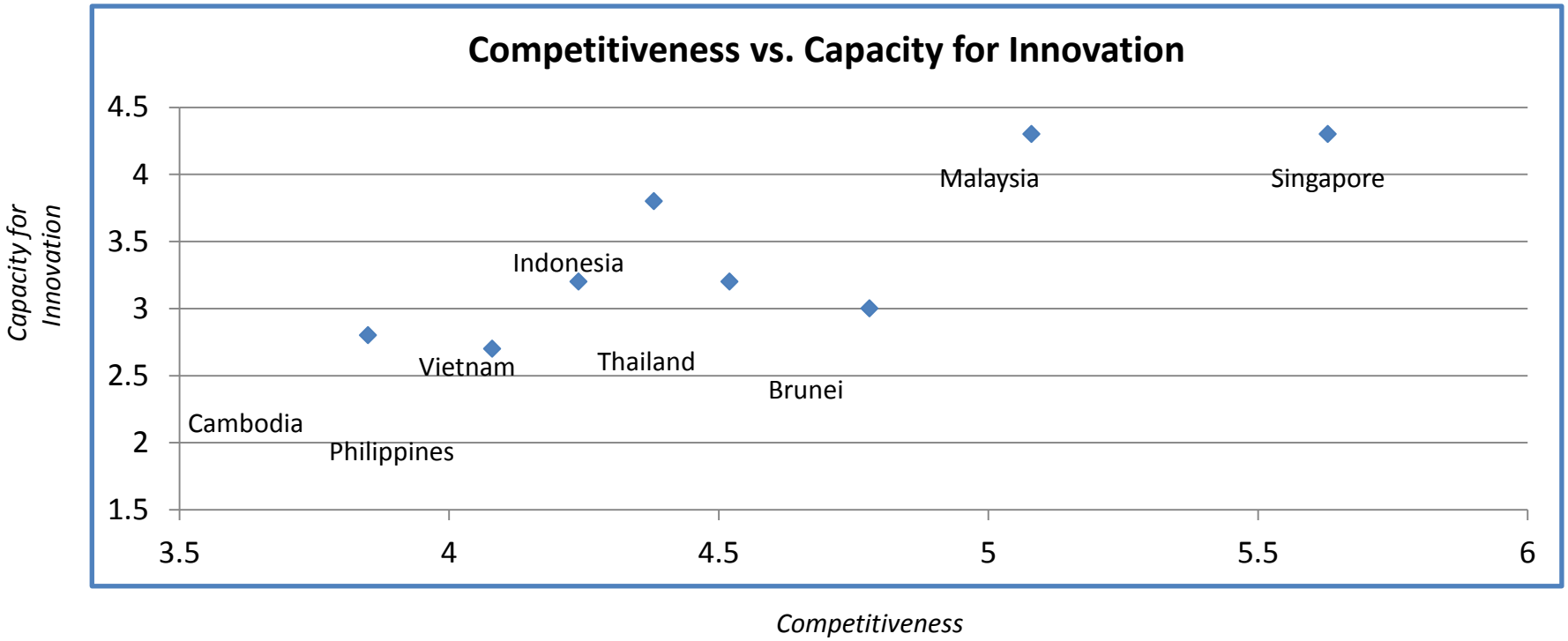
Rank/142

	Competitiveness	Innovation
Brunei	28	68
Cambodia	97	85
Indonesia	46	36
Malaysia	21	24
Philippines	75	108
Singapore	2	8
Thailand	39	54
Vietnam	65	66

Score/7

	Competitiveness	Innovation
Brunei	4.78	3.15
Cambodia	3.85	3
Indonesia	4.38	3.59
Malaysia	5.08	4.32
Philippines	4.08	2.79
Singapore	5.63	5.33
Thailand	4.52	3.3
Vietnam	4.24	3.16

source: WEF GCR 2011-2012



Rank/142

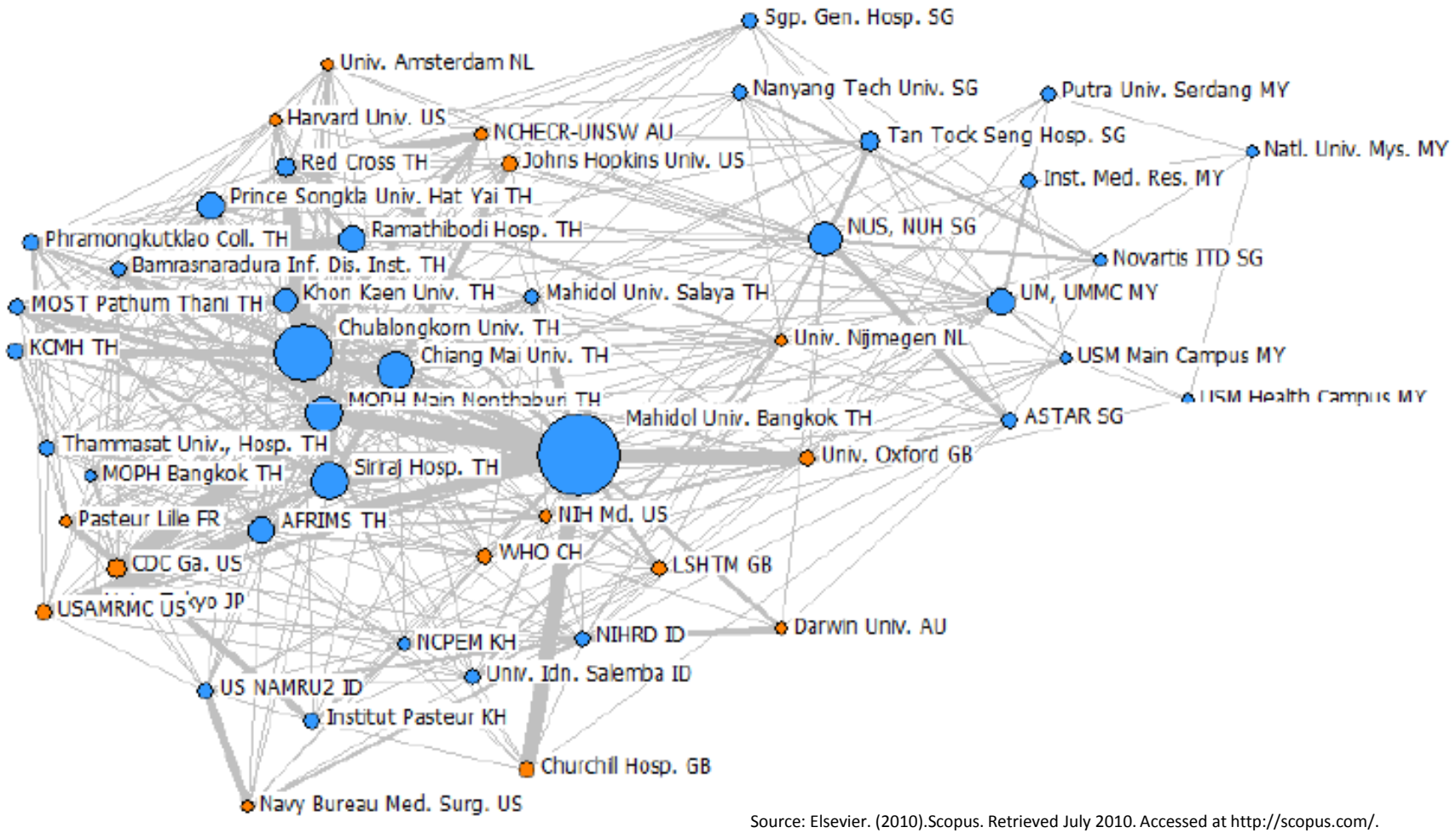
	Competitiveness	Capacity for Innovation
Brunei	28	75
Cambodia	97	85
Indonesia	46	30
Malaysia	21	19
Philippines	75	95
Singapore	2	22
Thailand	39	56
Vietnam	65	58

Score/7

	Competitiveness	Capacity for Innovation
Brunei	4.78	3
Cambodia	3.85	2.8
Indonesia	4.38	3.8
Malaysia	5.08	4.3
Philippines	4.08	2.7
Singapore	5.63	4.3
Thailand	4.52	3.2
Vietnam	4.24	3.2

source: WEF GCR 2011-2012

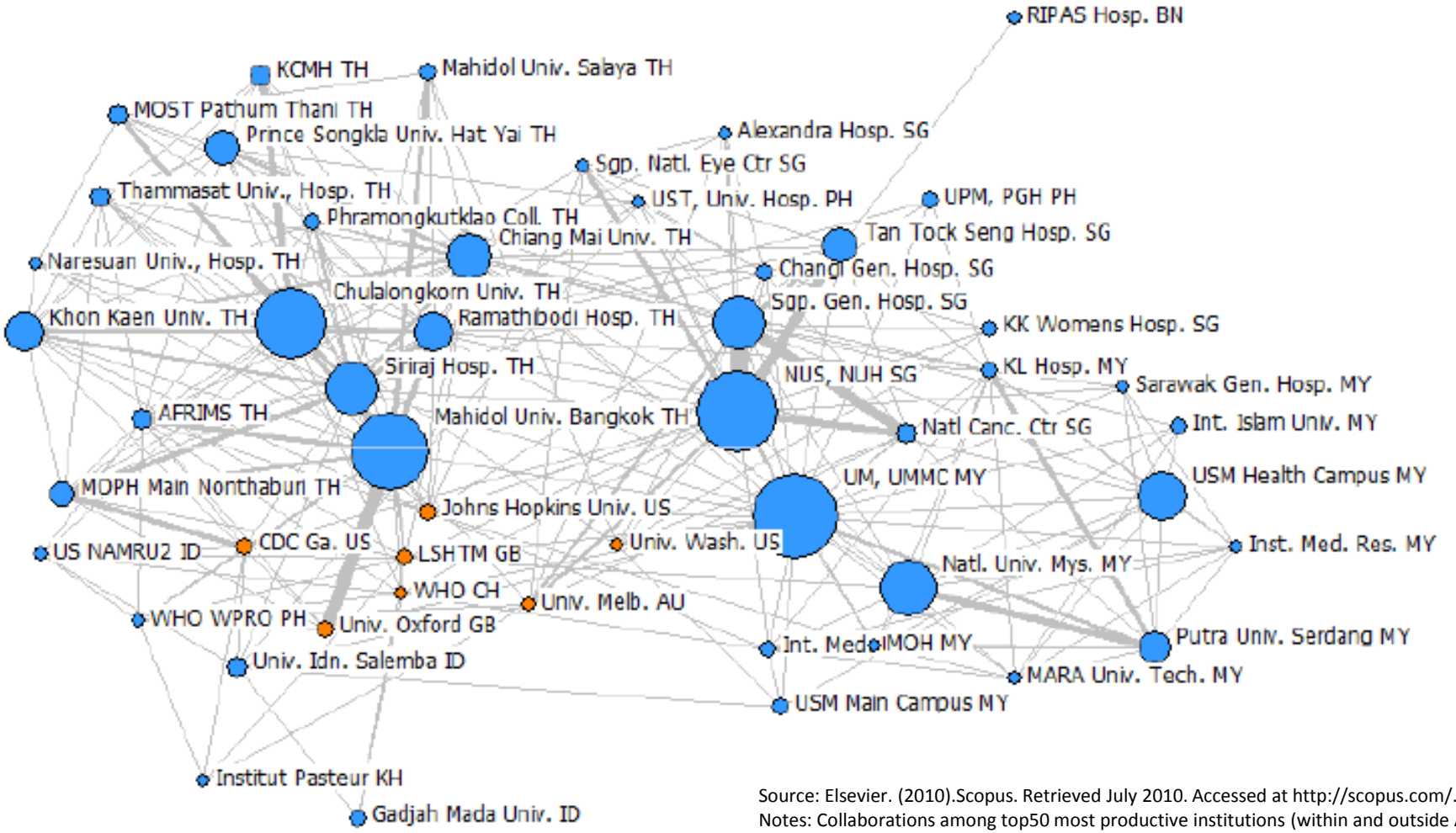
Collaborations among top 50 most productive institutions for infectious disease research



Source: Elsevier. (2010).Scopus. Retrieved July 2010. Accessed at http://scopus.com/.
Notes: Collaborations among top 50 most productive institutions (within and outside ASEAN) based on articles on infectious diseases.
Size of nodes indicates relative number of articles. Thicker links indicate more instances of collaboration between the two institutions. Blue nodes are
institutions in the ASEAN region, while orange nodes represent institutions outside ASEAN.

Reported by Jaime Montoya, Mapping Activity for the Establishment of the ASEAN Network for Drugs and Diagnostics Innovation (ASEAN – NDI), 2010.

Collaborations among top 50 most productive institutions for diagnostics research



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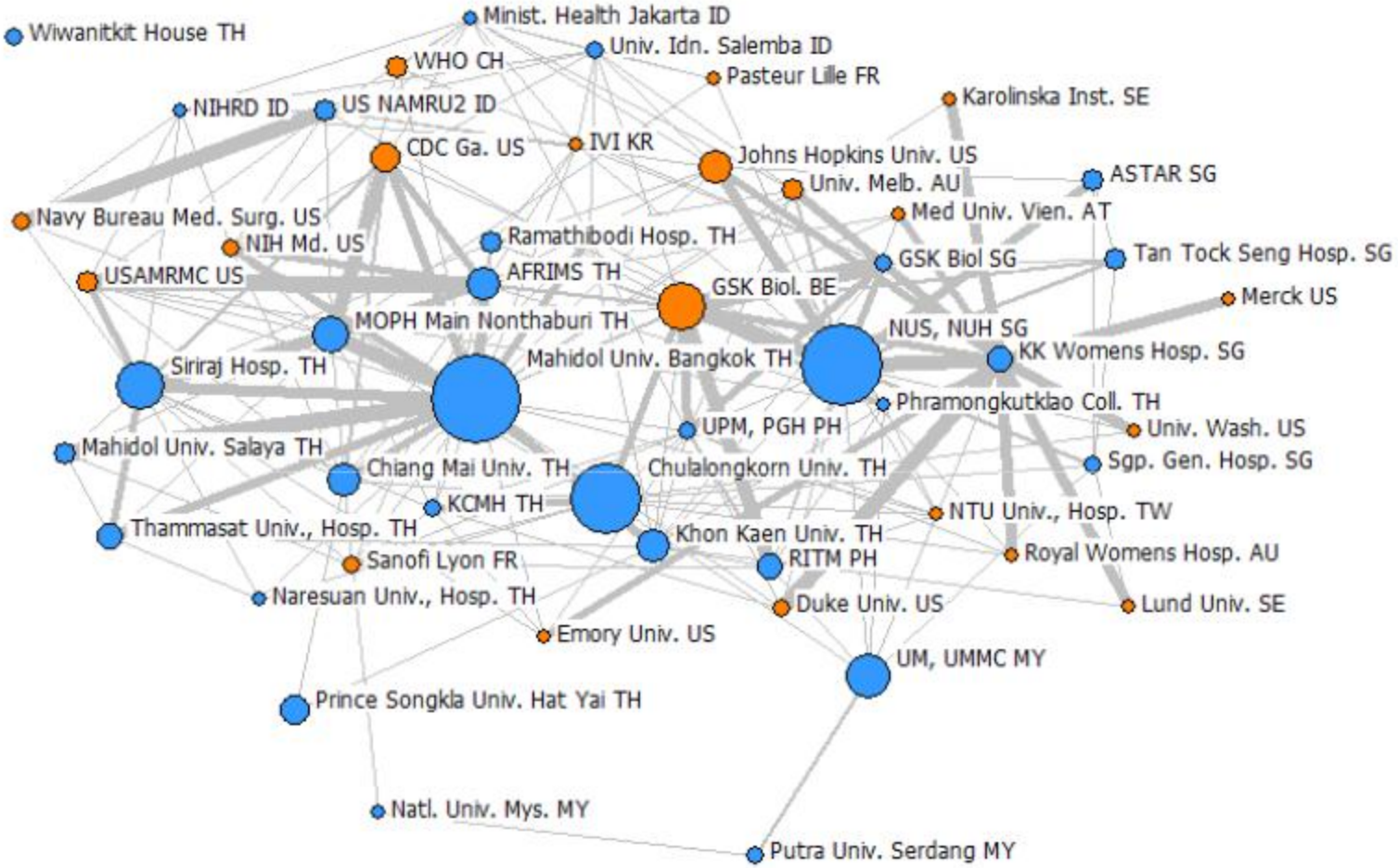
Reported by Jaime Montoya, Mapping Activity for the Establishment of the ASEAN Network for Drugs and Diagnostics Innovation (ASEAN – NDI), 2010.

Collaborations among top 50 most productive institutions for vaccines research



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ASEAN-NDI Mission/Vision

- **Mission** (proposed)

  To address the unmet public health needs of ASEAN nations through the advancement of ASEAN-led health product innovation in the areas of drugs, vaccines, traditional medicine and diagnostics in order to improve health outcomes in the ASEAN region, and beyond, and to support its sustainable regional economic development

- **Vision** (proposed)

  To be Asia's premier facilitator for collaborative innovation in R&D in health products

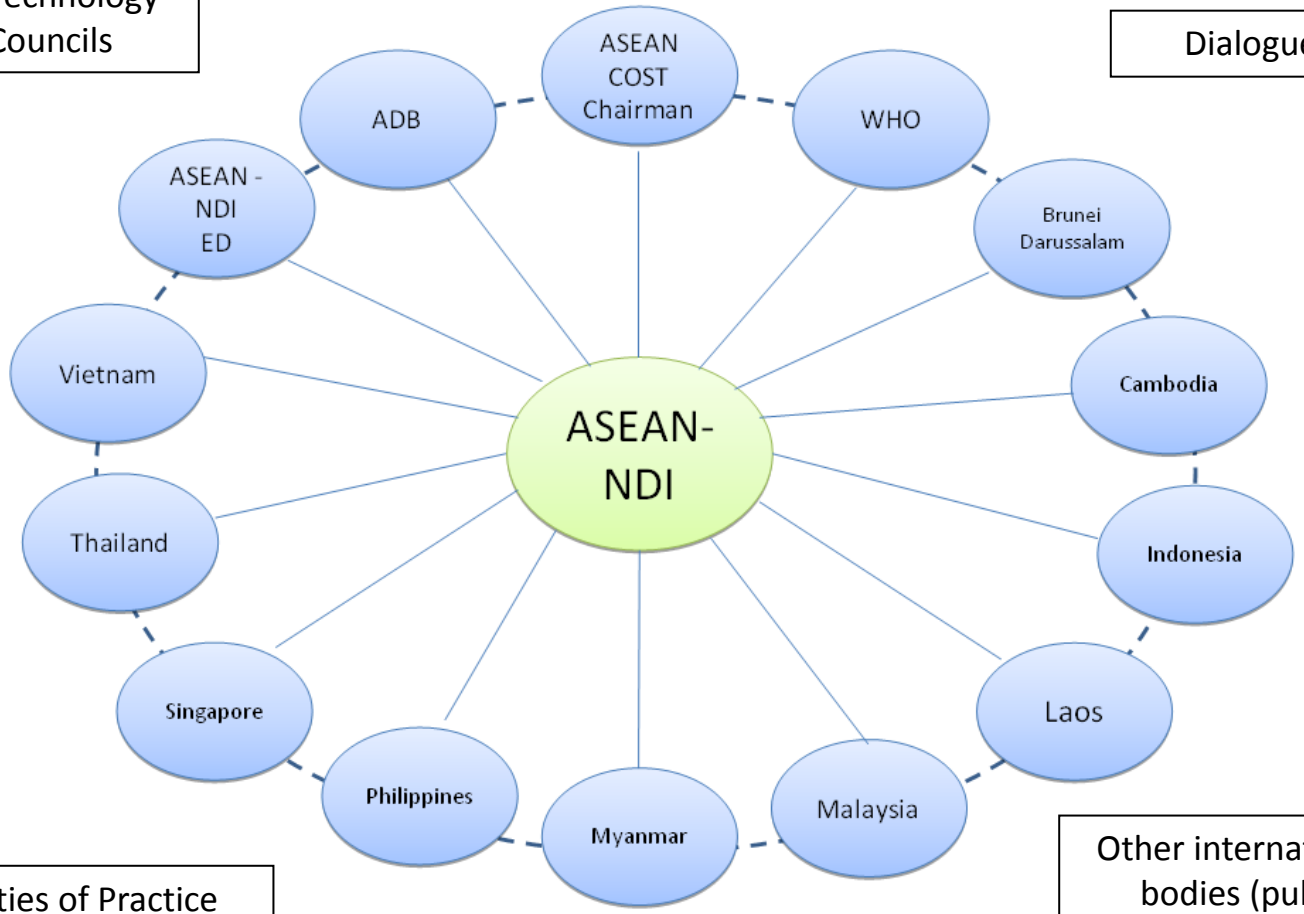
ASEAN–NDI Framework

Problems	Inputs	Processes	Outputs	Outcomes
Low Degree of Collaboration	Local researchers in regional networks	R&D processes including traditional medicine	Affordable new health products, e.g. drugs, vaccines, diagnostics including those based on traditional medicine/ complimentary and alternative medicine •Efficiency •Quality •Access	Improved health status (poor , rich) •Delivery/ access •Customer satisfaction •Risk reduction
Significant knowledge gap	Global information & knowledge access; local knowledge	Explicit and tacit knowledge used; Appro-tech vs. hi-tech monitoring and reporting systems		
Insufficient investment	Health research system infrastructure (hard and soft)	From R&D activities to the production/ distribution process; Ethics standards adoption/ adaptation & implementation		
Ownership of R&D in and for ASEAN	ASEAN Innovation Fund			

ASEAN – NDI Governing Board Structure (proposed)

Science and Technology Advisory Councils

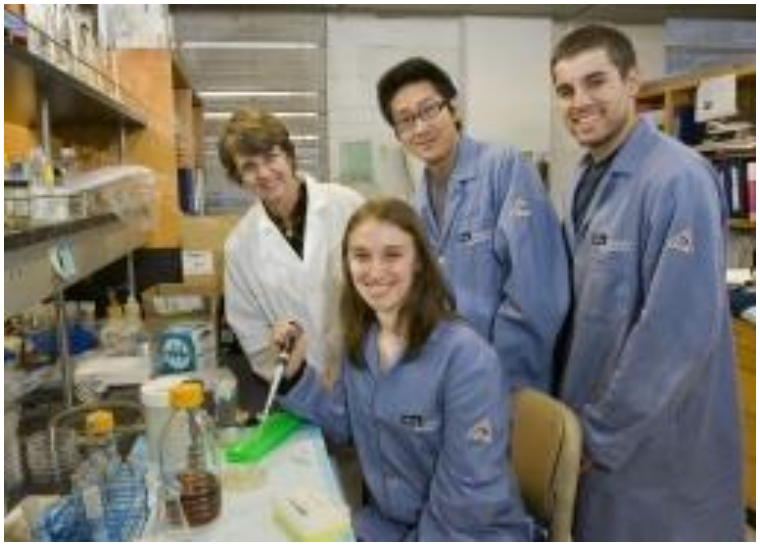
Dialogue Partners



Communities of Practice

Other international or regional bodies (public or private)

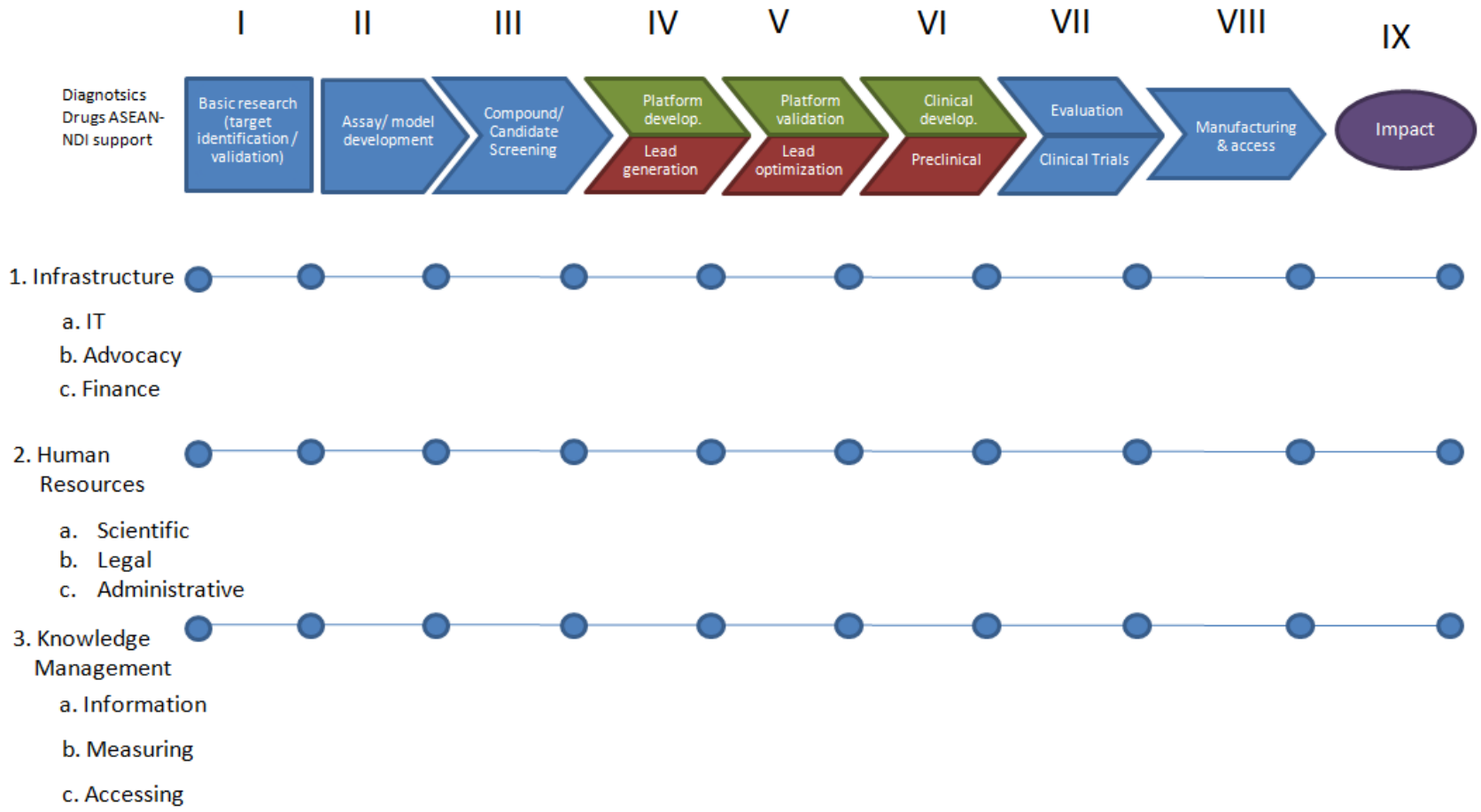
ASEAN – NDI Secretariat



MANAGEMENT ISSUES FOR SCIENTISTS AND HEALTH PROFESSIONALS

1. R&D value chain
2. Knowledge management
3. Financing public goods

THE ASEAN-NDI R&D VALUE CHAIN: Inputs



The inclusion of Innovation Systems

Innovation Communities Depend on an Innovation System

1. **Platform**

   Merges stakeholder networking and idea management functions
2. **Process**

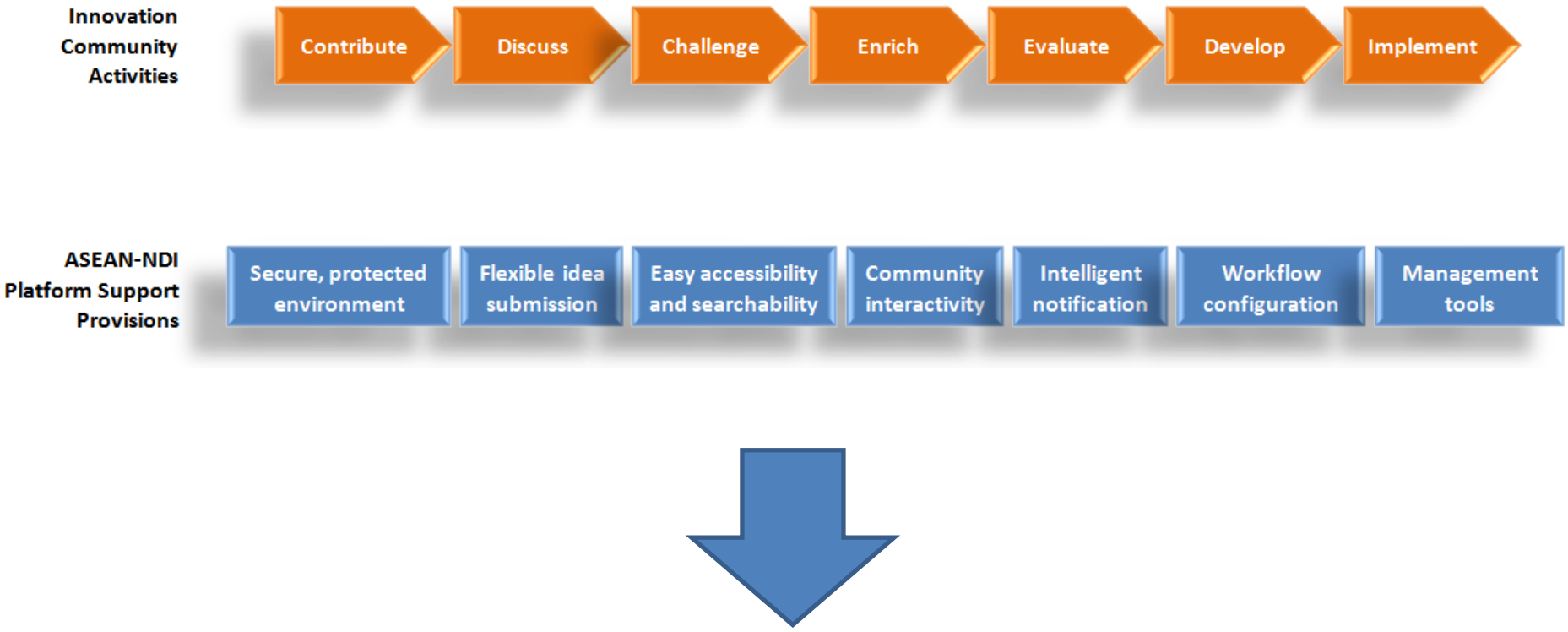
   Aggregating stakeholder knowledge and leveraging this knowledge
3. **Monitoring and Evaluation System**

   Assess progress on implementation and review outcomes
4. **Metrics**

   Measure the value and flow of ideas
5. **Governance Structure**

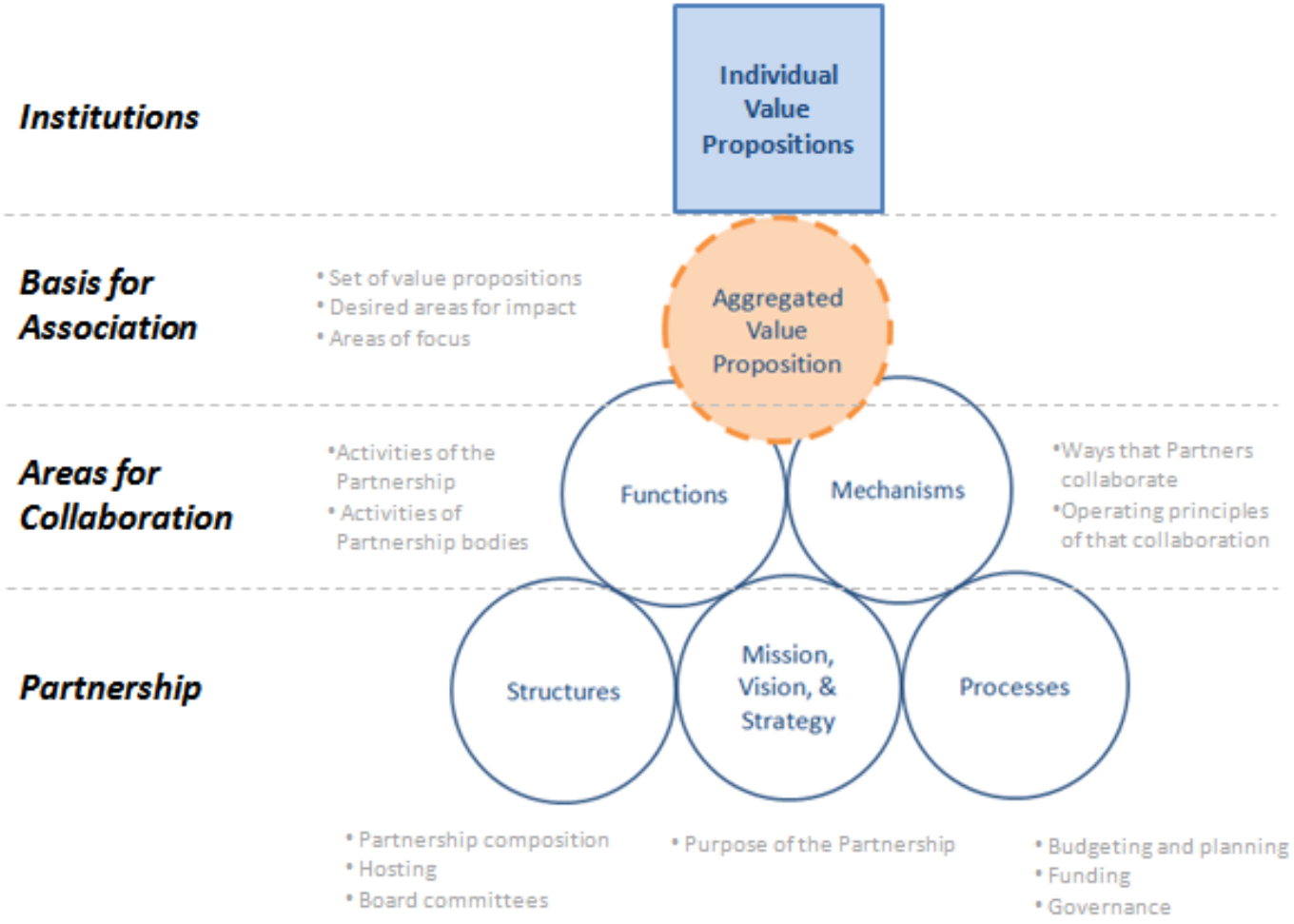
   To facilitate above

Activities of Innovation-Driven Communities of Practice (COPs)



Coordinated and Cooperative Strategy

COP Partner Value Mapping



Adapted from Boston Consulting Group (2008) "Roll Back Malaria"

Knowledge Management (KM) for ASEAN-NDI

- Definition:

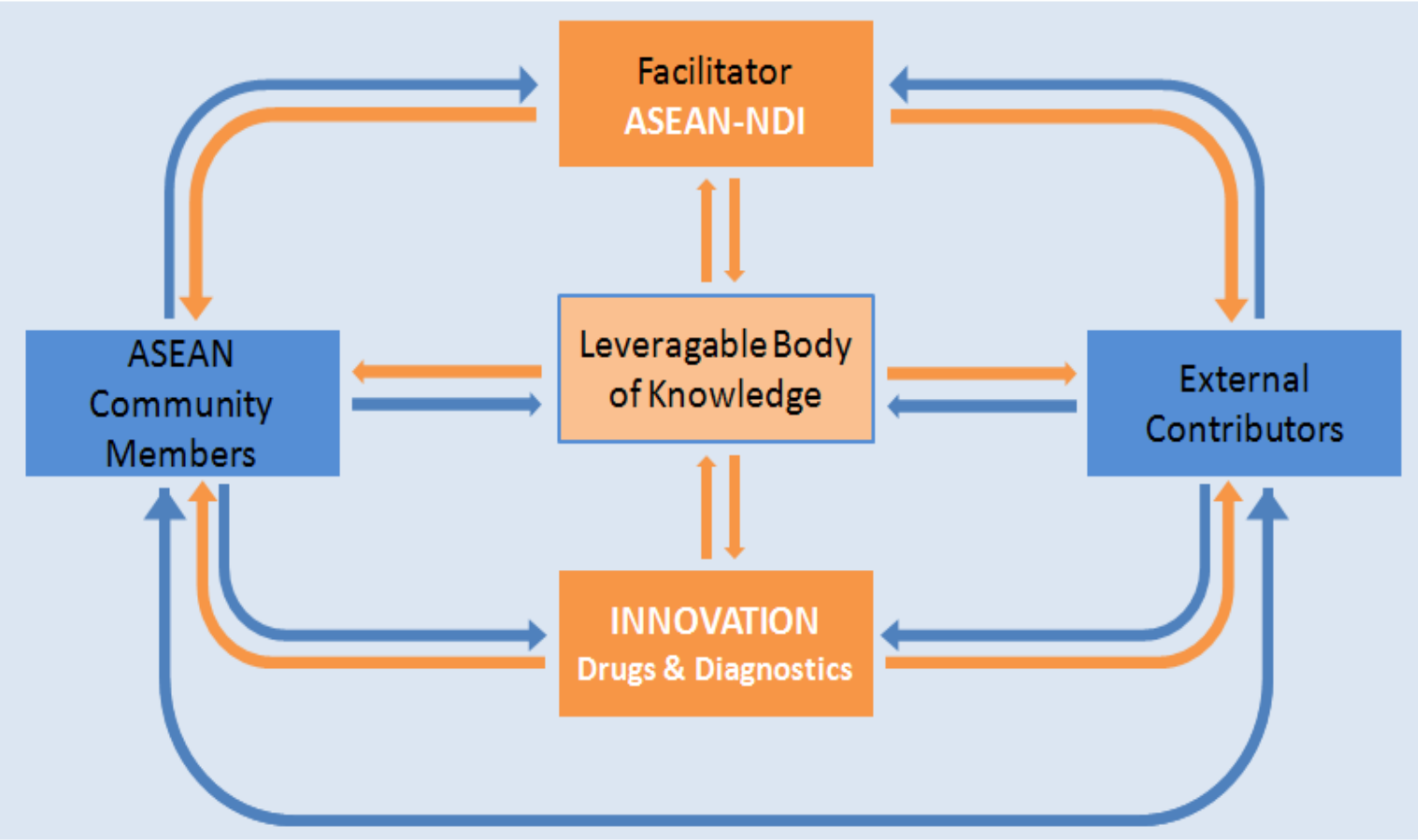
  KM is about the sourcing and deploying of knowledge (e.g., human capital such as scientists and professionals) through workable practices (structural capital that include laboratory equipment, research facilities, as well as codified and tacit knowledge among COPs) and working relationships (relationship capital of scientists with other stakeholders in the polity, society and economy), to improve overall organizational performance.

  The provision of appropriate knowledge to the right parties at the right time, in order to help them apply such knowledge in ways to achieve desired goals.

Knowledge Management (KM) System for ASEAN-NDI: The Participants

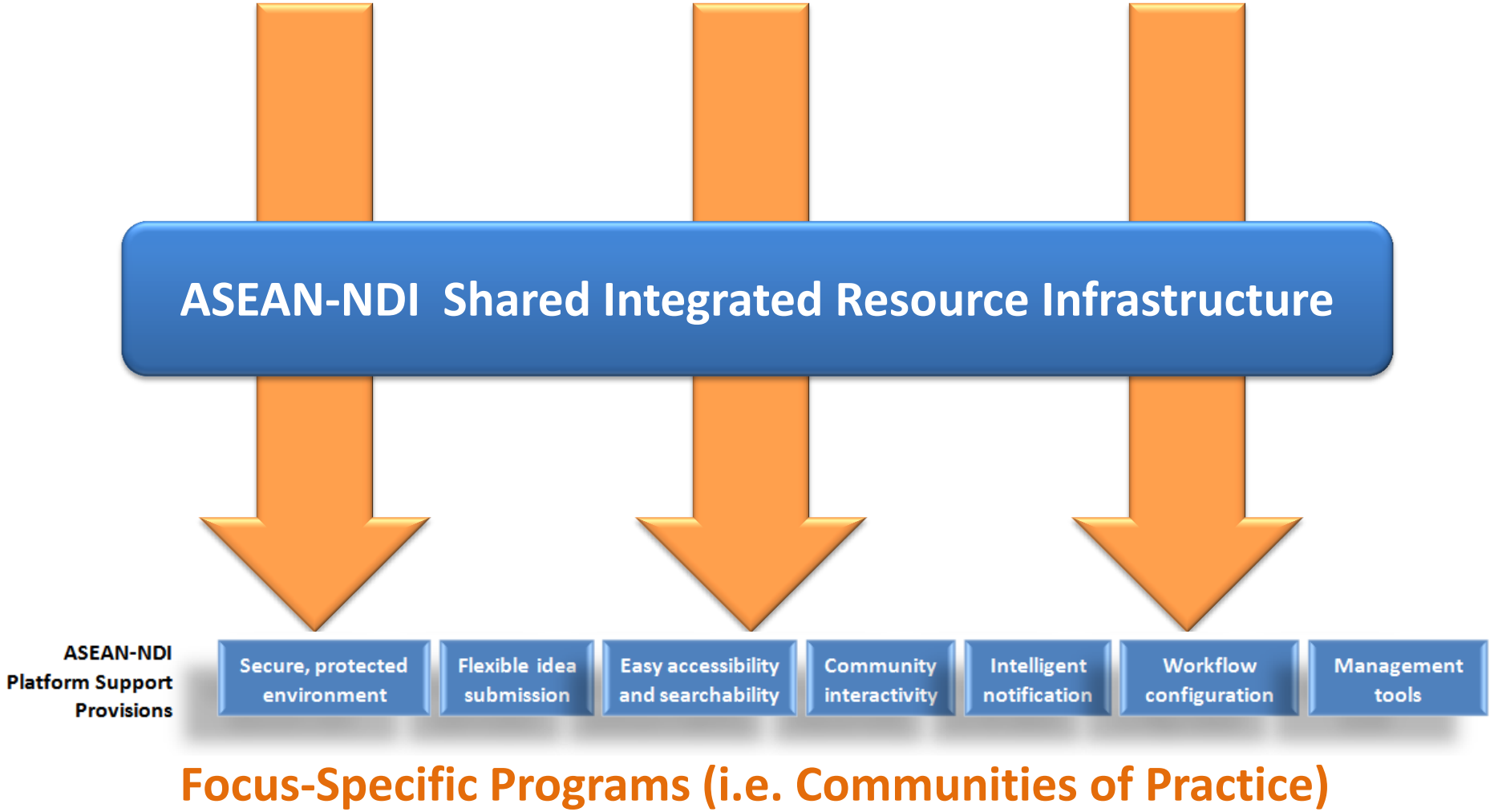
ASEAN Community Members	ASEAN stakeholders with a common interest who will gain from utilizing the LBK. The underlying logic behind this is that individual community members who maybe slower in creating the LBK independently, e.g. collaborative health care Web-based models, may need ASEAN-NDI.
External Contributors	Participants outside the ASEAN community who have valuable and relevant knowledge (and other resources) that become part of, or enable the development of the LBK. Thus the ASEAN community members' needs will determine the extent of interaction with external contributors. External contributors can include Web-based communities also.
ASEAN-NDI = Facilitator	ASEAN-NDI, acting as facilitator, manages the set of processes, infrastructure, and interactions which build on the LBK, especially if community members and external contributors are not capable of managing the LBK.

Knowledge Management and the Knowledge Network: The foundation of the ASEAN-NDI COPs

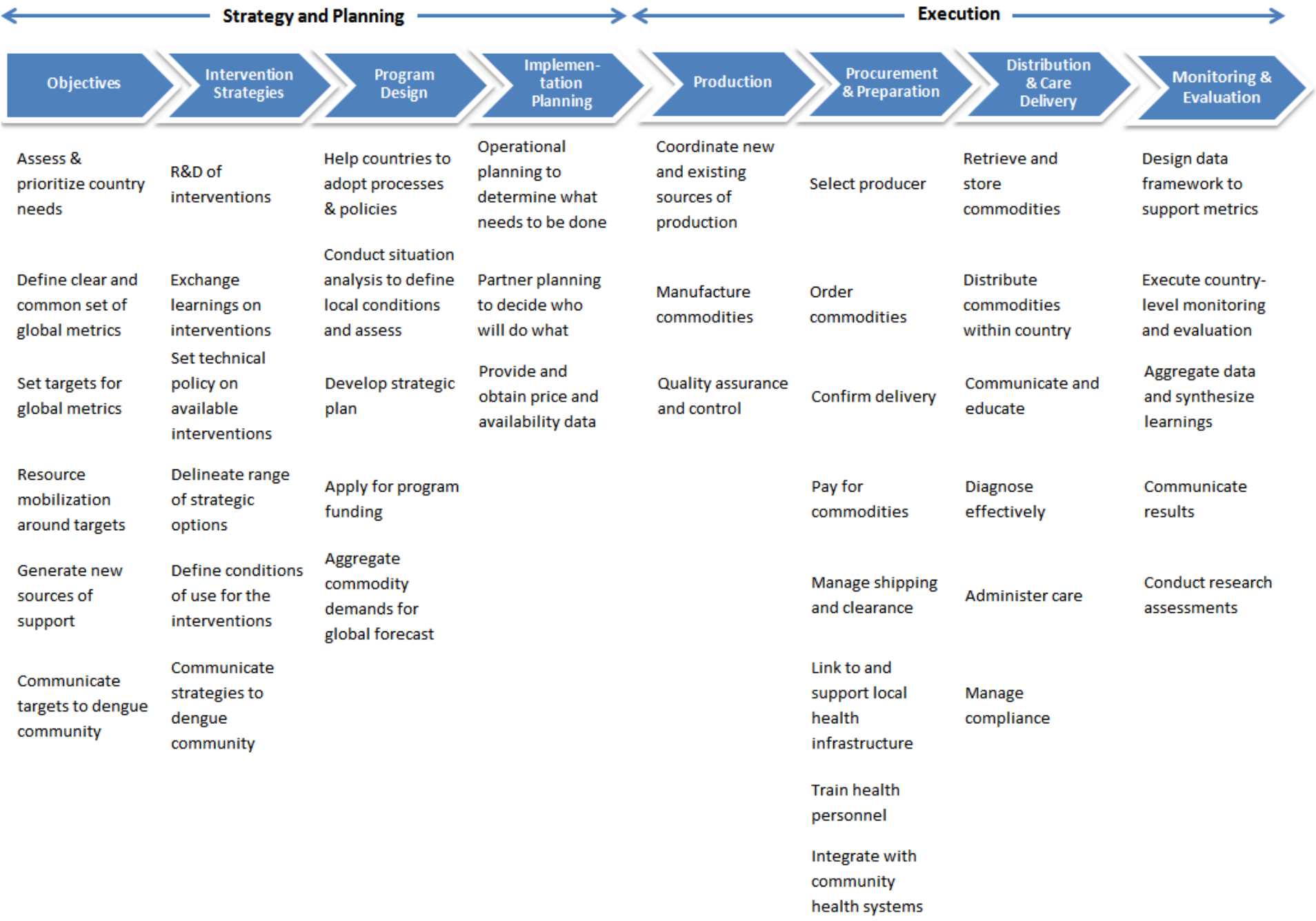


The Leveragable Body of Knowledge (LBK) consists of both the **explicit** and **tacit** knowledge of the participants

Shared Infrastructure:
Integrating Vertical & Horizontal Programs



Dengue Value Chain



Will the ASEAN NDI COP Value Chains be sustainable?

- **Stakeholder-Driven and Participatory System → SUSTAINABILITY**

- The COPs will engage stakeholders from all levels of the value chain in crafting a value chain solution/strategy that maximizes opportunities and minimizes constraints in order to maximize competitiveness, all in a manner that emphasizes healthy and strategic collaboration.

How will ASEAN-NDI be funded?

Different cost-sharing arrangements for

- curbing the spread of a pest or disease
- monitoring an outbreak
- creating crisis management teams
- developing a best-practice for treating region-specific disease
- treating diseased patient

The cost-sharing will depend on the characteristics of the public good: non-rivalry, excludability, aggregation technology. These sound technical – but that is the spirit of managerial sciences and economics – to provide guidance based on principles, not mere "gut feel" of what lay people believe should guide them.

Source: FMM, Presentation at IMDMDEVPro2012

Innovative Sources of Financing for Network Communities in Health Research (1)

Proposals on funding including four innovative sources assessed on the following criteria: fundraising capacity, additionality, likelihood of acceptability, and operational efficiency:

- **New indirect tax:** more progressive rather than regressive (rich bearing the tax burden in greater proportion than poor), as an airline tax channeled through an international mechanism, and if regressive, such as "sin" tax, this aspect could be redressed by altering other taxes; taxes on fat, sugar and tobacco (which are directly health-related); financial transactions tax; tobacco solidarity contribution

- **Voluntary contributions** from businesses and consumers: Former US President Bill Clinton and UN Secretary-General Ban Ki-Moon launched MASSIVEGOOD, a voluntary airline consumer contribution arranged by the Millennium Foundation of UNITAID

  (unfortunately not a well-recognized brand outside the global health community→ of the forecast revenues of US$590M in 2010 and US$980M in 2011, only US $200,000 was raised in 2010 and much less in 2011)

WHO, Sixty-Fifth WHA, A65/24, 20 April 2012
Source: FMM, Presentation at IMDMDEVPro2012

Sources of Financing (2)

- **Taxation of repatriated profits of the pharmaceutical industry**: Brazil's proposal for a 1% tax on profits of non-domestic pharma firms ; proceeds can be recycled by a directing council which can give funds to the research entities, e.g., in ASEAN NDI including the drug companies themselves.

  However, ASEAN NDI will have to conduct additional research on transfer pricing, international corporate taxation, applicable tax agreements, relationships with national industry, and commitments made by individual countries in their trade and investment agreements.

- **New donor funds for health R&D:** additional assistance from existing donors not likely in a weak global economy given the fallout from the Euro crisis, the US subprime mortgage crisis, and post-tsunami Japan

WHO, Sixty-Fifth WHA, A65/24, 20 April 2012
Source: FMM, Presentation at IMDMDEVPro2012

Sourcing is one side of Finance; Uses of Funds is the other

Principles of cost-sharing when there are PUBLIC GOODS

1. Understand what public goods are so that one is not enslaved by the idea that finance is mere sourcing of funds.
2. Public goods are characterized by:
   - Non-rivalry in consumption
   - Non-excludability or difficulty to exclude some consumers from the production perspective
   - Aggregation technology – the extent to which commonality is shared by different publics
3. Principles for efficient use of funds are needed to use/ disburse monies from members, donors, partners, etc.

Adapted from FMM, Presentation at IMDMDEVPro2012

Conclusion:
Ideas to take home for action

- There are many models for collaboration and partnership in health research
- Scaling up health cooperation/collaboration in ASEAN through network communities like ASEAN-NDI is a way to improve access to affordable, quality and timely health products
- R&D professionals must be aware that they are part of a value chain working towards a set of outcomes
- Collaboration increases innovation (and can solve seemingly insurmountable R&D challenges), and is supported by the use of IT-mediated technologies
- Knowledge management is fundamental to open collaboration