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Sciences Economiques & Sociales de la Santé
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Sauman SINGH

Doctorante au sein de l'équipe ESSEM - UMR 912 - SESSTIM

A Bitter-Sweet Pill : Learning from the Development of Synriam

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A Bitter-Sweet Pill?

LEARNING FROM THE DEVELOPMENT OF SYNRIAM™

Supervisor:
Fabienne ORSI

Sauman SINGH
PhD Candidate

What is at Stake?

What are the pre-conditions for the creation of a commons of medicines?

Presentation Outline

1. Context
 - What are Neglected Tropical Diseases (NTDs)?
 - The need for alternative R&D
 - Emergence of Product Development Partnerships (PDPs) as alternative
2. Medicines for Malaria Venture (MMV) and the development of Synriam
3. Learning from the development of Synriam

1. Context

What are NTDs?

- Disproportionately high burden in southern countries
- Reluctance of pharmaceutical companies to invest into R&D
- A wide range of infections:
 - Leishmaniasis, Sleeping sickness, Chagas disease, Bacterial pneumonia & meningitis, Lymphatic filariasis, Trachoma, Buruli ulcer, etc.
- The Big Three: HIV/AIDS, Tuberculosis, Malaria

The Need for Alternative R&D

- Global Forum for Health Research (1999): less than 10% of global R&D investment on health conditions primarily affecting 90% of the population
- *Trouiller et al., 2002 and Pedrique et al. 2013*
 - 1975-2011: Only 20 (1.1%) of 1729 new chemical entities targeted NTDs
- NTDs Account for:
 - 11% of the global disease burden
 - 32% of the burden of ill health in Africa

PDPs as the Alternative

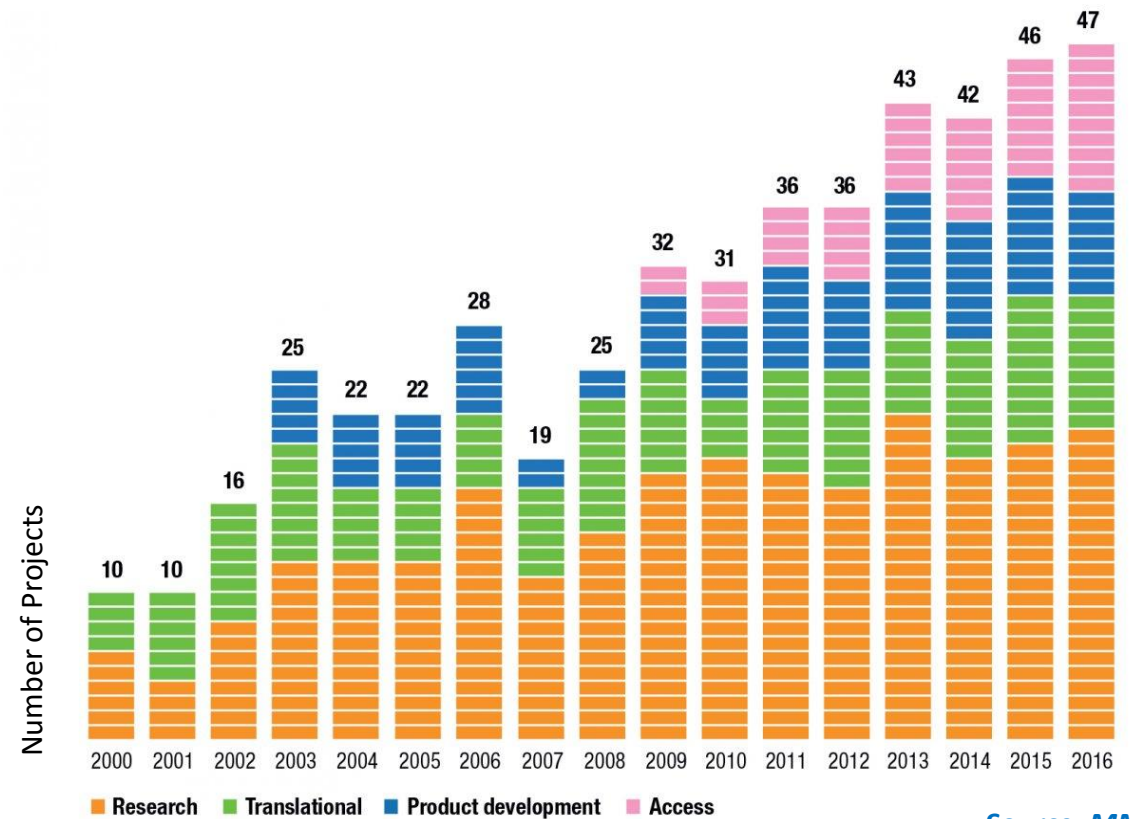
- Product Development Partnerships (PDPs): self-governing, private, non-profit organizations
- Driven by public health need rather than commercial returns
 - Deliver medical technologies – drugs, vaccines, and diagnostics – to address the unmet health needs of the poor
- Social experiments to address market-failure
 - Virtual pharmaceutical companies
 - Bridging public and private sectors
 - Integrators and brokers of innovation
- Each PDP is different
 - Different target disease and product profile

2. MMV and the Development of Synriam

MMV: a PDP for Malaria

- Medicines for Malaria Venture (MMV)
 - Formed in 1999
- Seed Funding: \$ 4 million
 - The Government of Switzerland
 - UK Department for International Development
 - The Government of the Netherlands
 - The World Bank
 - Rockefeller Foundation
- MMV has changed the landscape of antimalarial R&D

Growth of the MMV Portfolio Since 2000

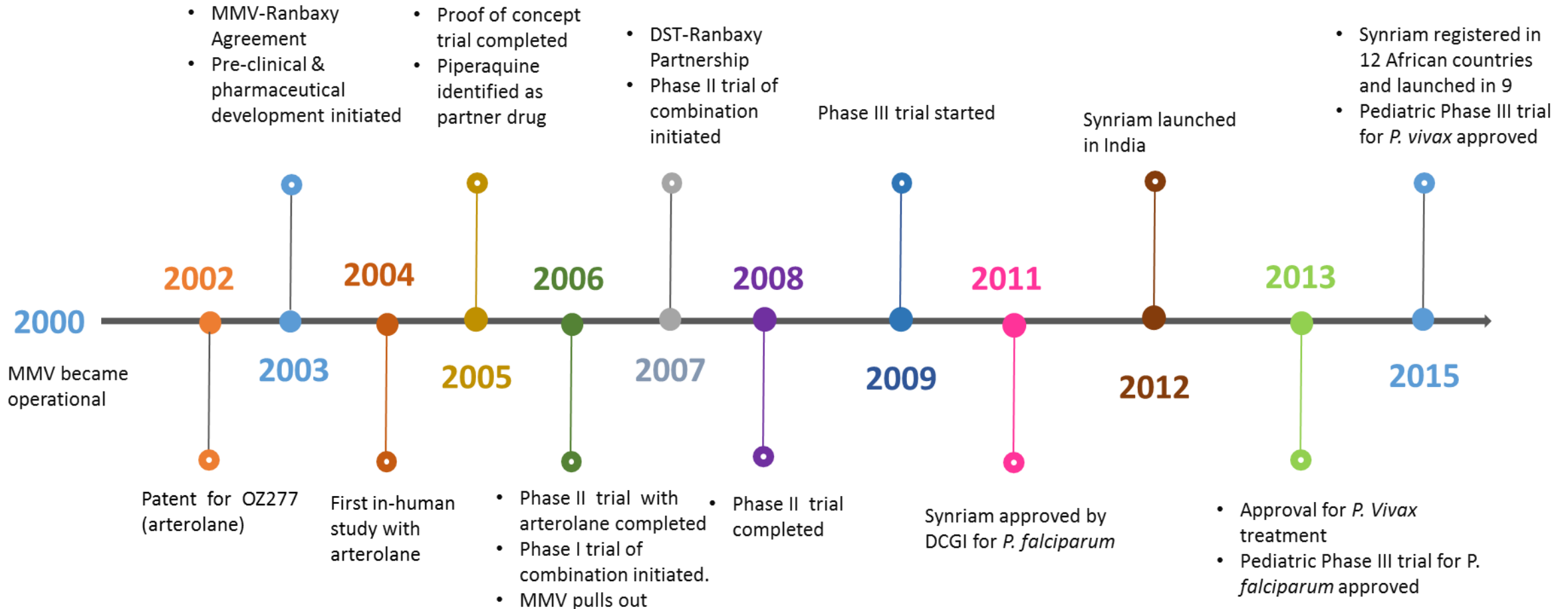


Source: MMV

Synriam – a New Antimalarial Drug

- Outcome of two partnerships
 - Product Development Partnership (PDP): MMV - Multiple Partners
 - Public-Private Partnership: Government of India - Ranbaxy
- Arterolane (OZ277): New Chemical Entity with antimalarial activity
- Fixed-dose combination (FDC) antimalarial
 - Arterolane Maleate (150 mg) + Piperaquine Phosphate (750 mg)
- Authorized by Drug Controller General of India (DCGI) in 2011
- Low pill burden: 3 Days-3 Pills treatment regimen
- Arterolane is synthetic → easy industrial scale-up

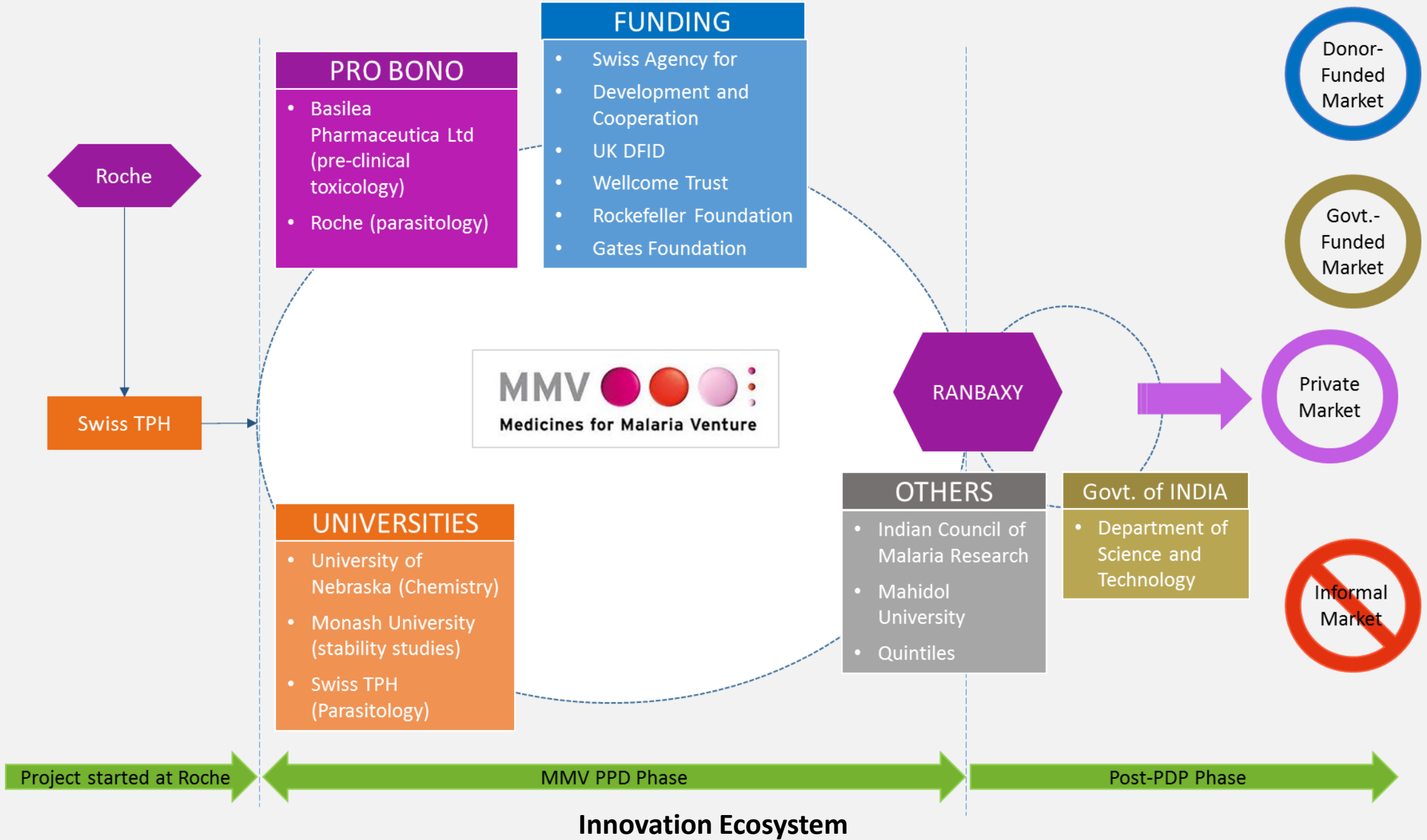
Development Timeline of Synriam



3. Learning from the Development of Synriam

Preconditions for Creating Pharmaceutical Commons

- Innovation Ecosystem
- Processing of Intellectual Property Rights (IPR)
- Institutional Markets
- Role of Funding



Creation of an Innovation Ecosystem

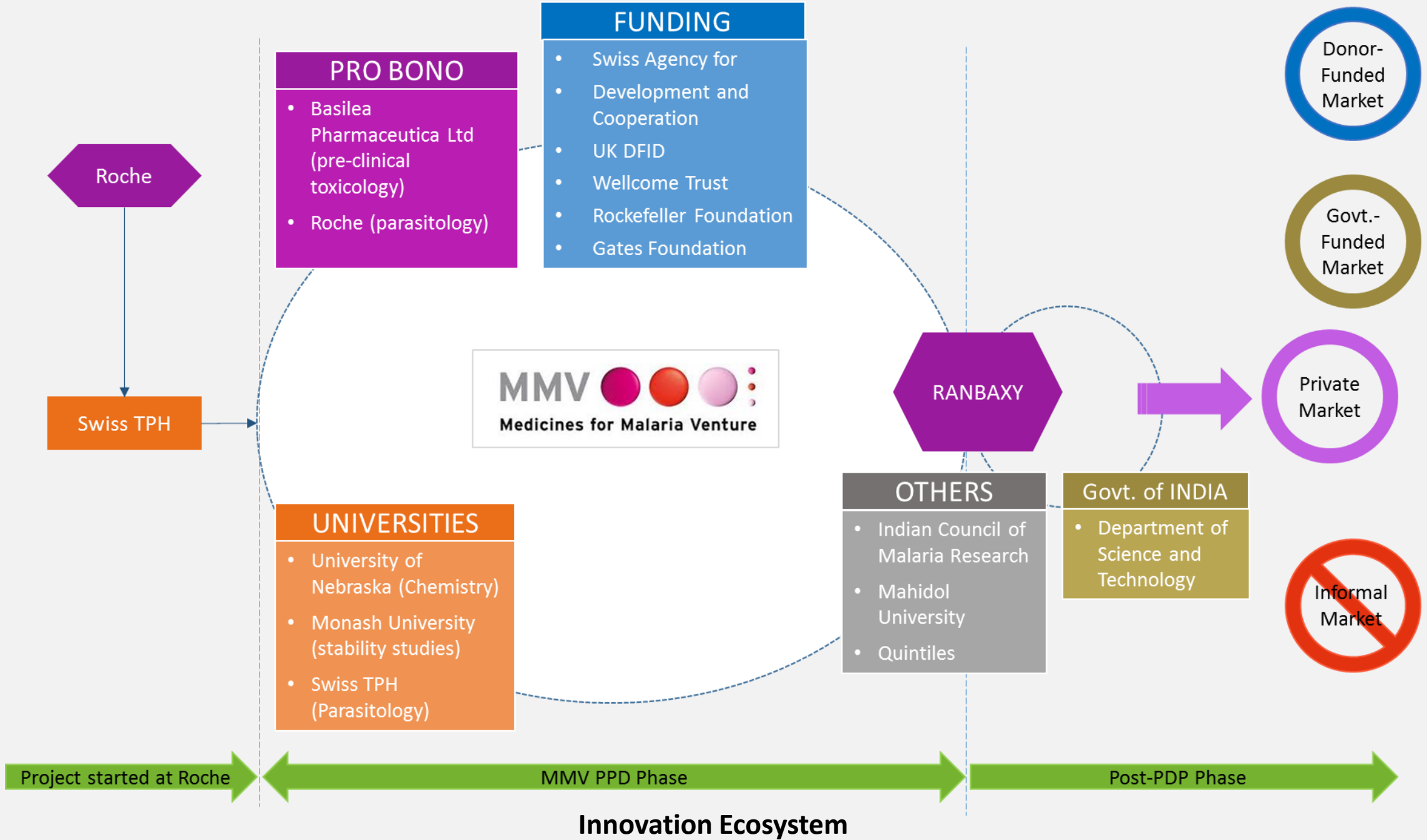
- Bringing the commons into existence: open-innovation
 - Away from firm centric model of innovation → ecosystem as a vertically integrated firm with PDP at the center
- Complex ecosystems
 - Partners with specific capabilities but common goal
 - Global Knowledge Infrastructure
- Works within the framework of existing institutions
 - Safety and efficacy rules, IPR regimes, etc.
- How to align incentives across partners?

Distribution of Rights: IPR Innovation

- Distribution of the terms of use associated with intellectual property
 - Initial MMV-Ranbaxy agreement: Separation of public and premium markets
- IPR innovation of PDPs: redesigning the terms of use
 - Bundle of rights (reminds of *Copy-left* and *FLOSS*)
- Recurring feature of different PDPs
 - Examples: DNDi-Sanofi → Artesunate+Amodiaquine (FDC)
 - DNDi-Cipla → Artesunate+Mefloquine (FDC)
- Objective: To bring safe, effective and affordable medicines for neglected diseases
 - Optimal social outcome

Product Needs a Market

- The root cause of *market failure* → Poor patients, resource-constraint governments
- Success of PDPs should not be seen independent of the creation of donor-driven institutional markets
- Emergence of a subsidized market is crucial for success
 - Even if a (biomedical) technology is meticulously – safe, effective, affordable, adapted to the needs of patients – developed
- Example: Biomedical products for the Big Three – HIV/AIDS, TB, & Malaria



Funding Is Critical

- 2006: MMV pulled out of the partnership with Ranbaxy based on phase I and phase II results
 - Total expenditure: \$28.8 million
 - \$7 million for discovery activities
- Sufficient funding is necessary for operating on not-for-profit model
- Origin of funding: public & philanthropic donors
 - Allows for structural power to negotiate with partners
 - Critical for delinking R&D costs from product pricing
- 2015: nearly half of all PDPs received more than half their funding from the Gates Foundation (G-Finder, 2016)

New Avenues of Funding

- Ranbaxy entered PPP with the Department of Science and Technology (Govt. of India)
- The Drug and Pharmaceutical Research Program (DPRP)
 - 2006-07: Loan = \$1 million
 - 2008-09: Grant-in-aid = \$2 million
- New source of funding → Fast growing developing countries
 - Indian government supported Synriam in great part due to reputational factor
 - Publicized as first Indian NCE (which it was not!)

Key Messages

- Creation of ecosystems, aligning incentives across partners
- Socially optimal processing of IPRs
- Construction of the institutional market for pharmaceutical products
- New avenues of funding → Fast growing developing countries

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