

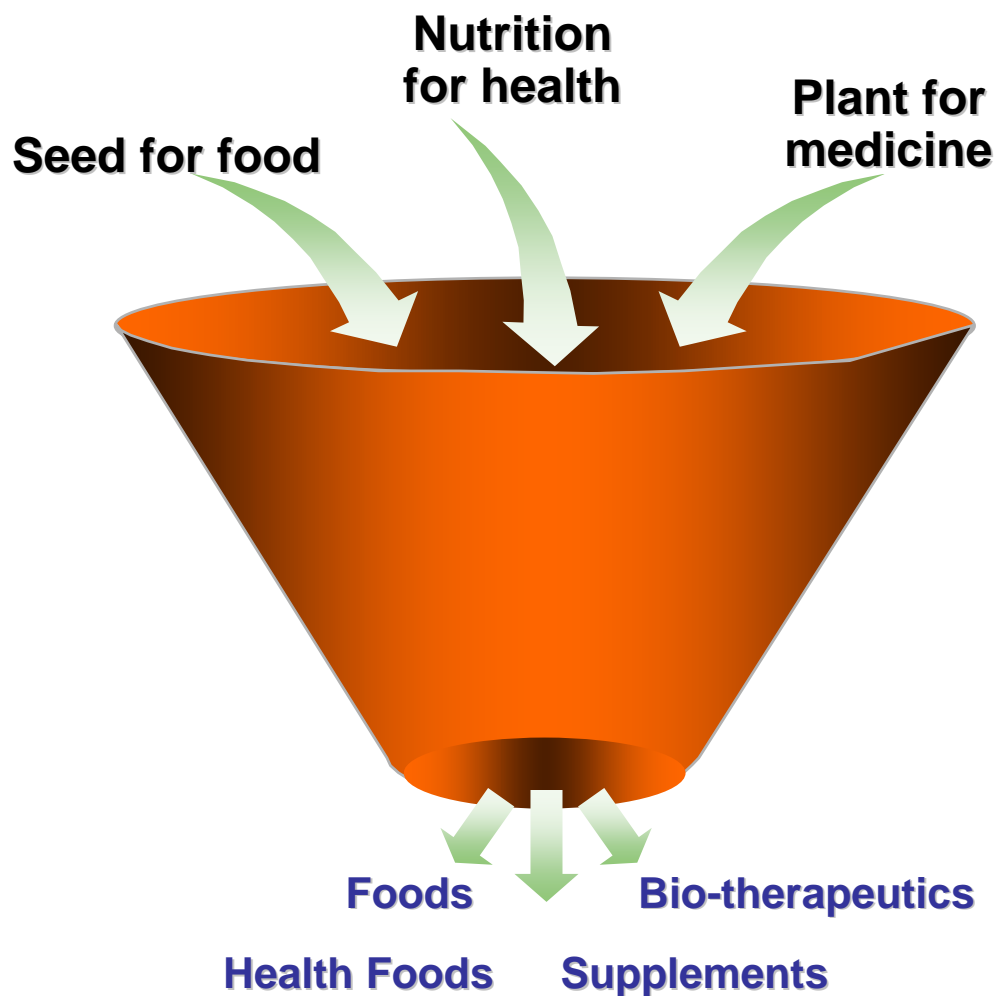
Doing Business With Your Technology in Asia

High-Growth Asia Markets - Panel 2

Emerging Biotech Markets in Asia

Dr. Viloo Morawala Patell
Founder & CEO, Avesthagen

Avesthagen: The Food-Pharma Convergence Platform



Agenda

- **Biotechnology in Asia**
- **Funding to Milestones – *Conventional vs. Avesthagen* Experience**
- **Global Model for Indian Biotechnology**
- **Balancing R&D Services with IP Development**

Biotechnology in Asia

- Asia is the second largest biotech market in the world with an anticipated revenue of \$100 by 2005
- A snapshot of Asia Pacific countries spending to build their biotech industry :

Singapore has set aside \$2B towards biotechnology industry.

Korea plans to spend \$10.8B over the next 5 years

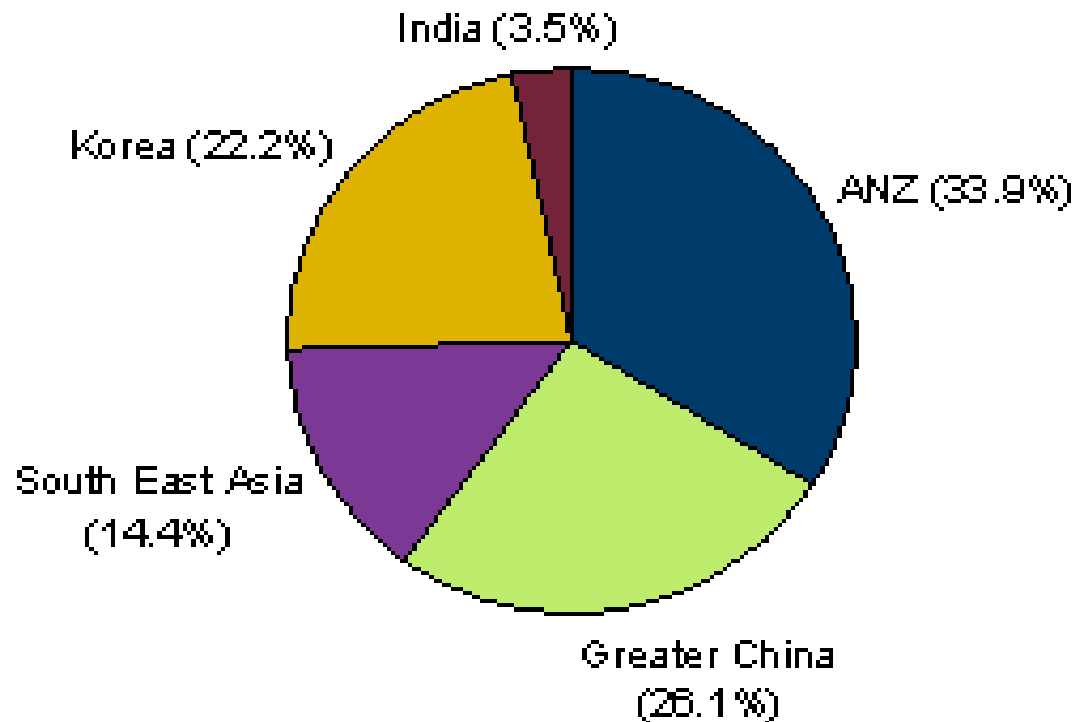
DBT in India has set up \$21 million venture fund.

Japan wants to create \$ 217 billion biotechnology industry to employ 80,000 people in 1000 biotech firms by 2010.

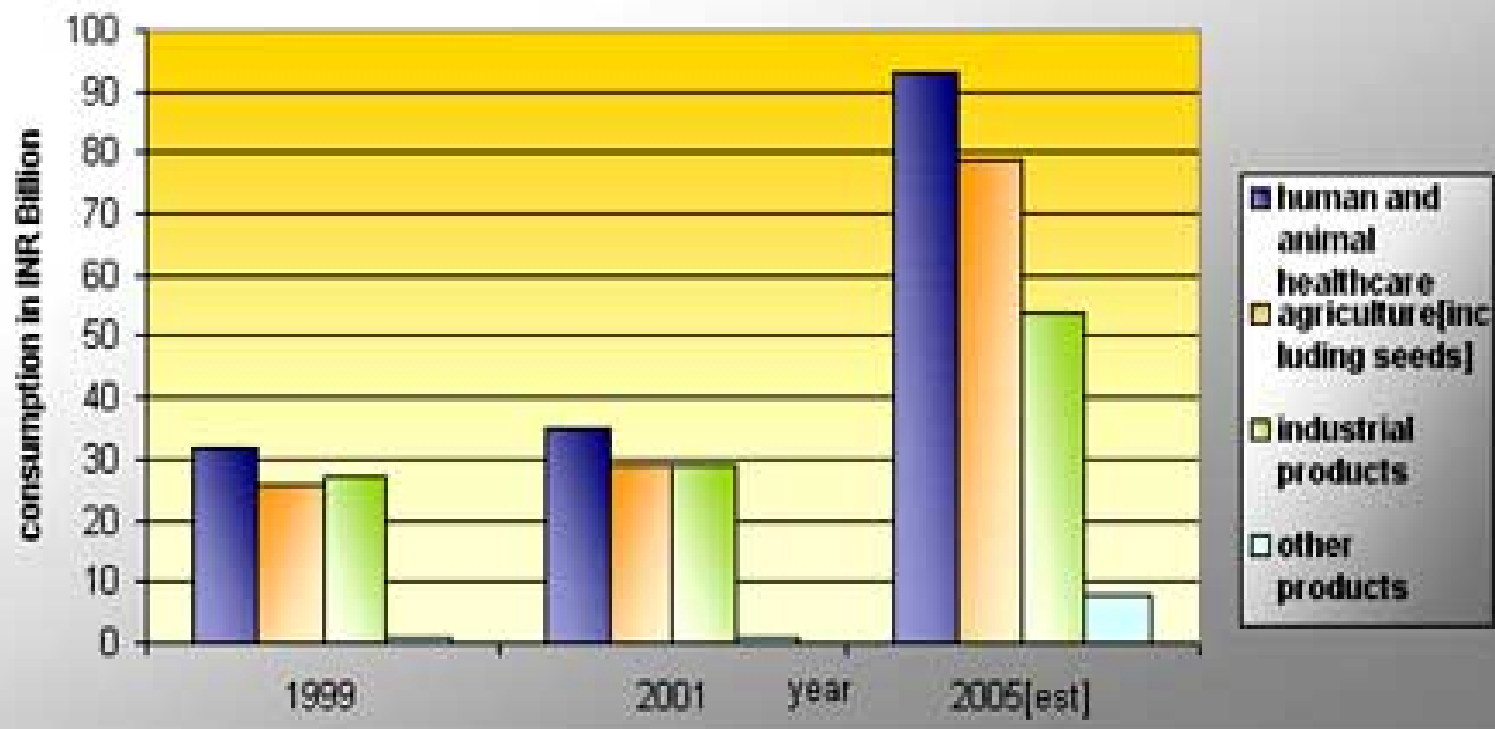
Taiwan is promoting BT as the next major growth sector& creating biotech Manufacturing zones in each of 5 industrial parks.

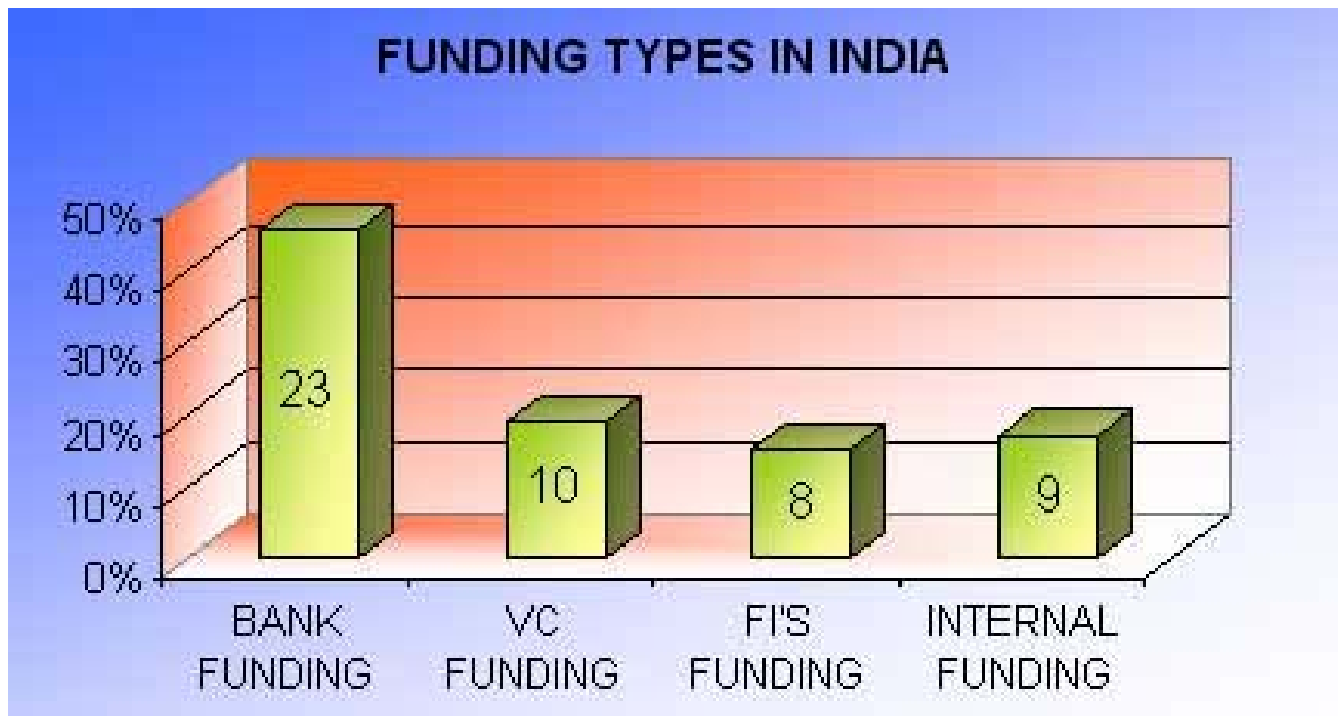
In China, in 10 years 50% of nation field are expected to be planted with biotechnology crop.

Asia/Pacific (excluding Japan) Bio-IT Percentage Split by Sub-Region (2002)



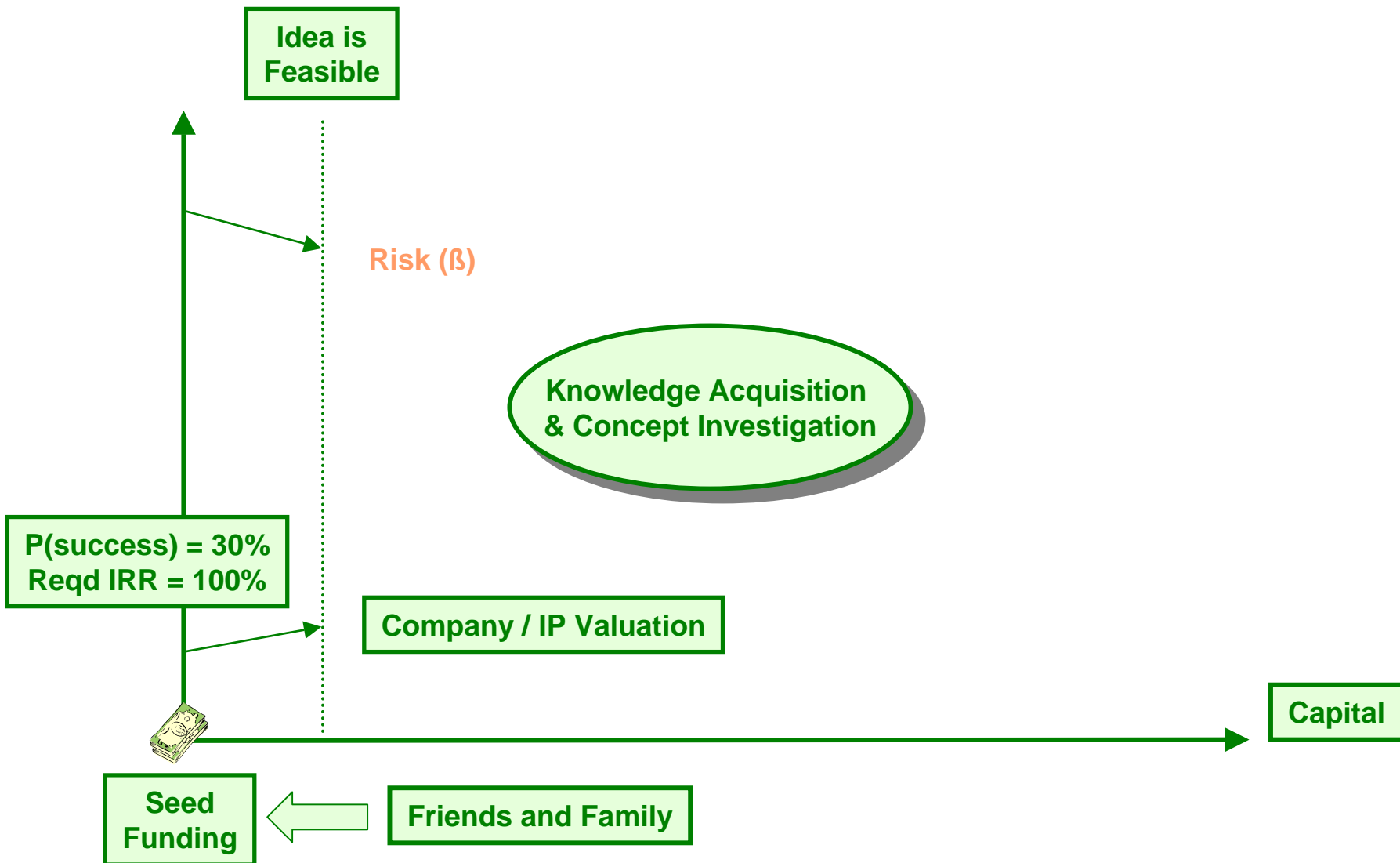
Consumption of Bioproducts in India



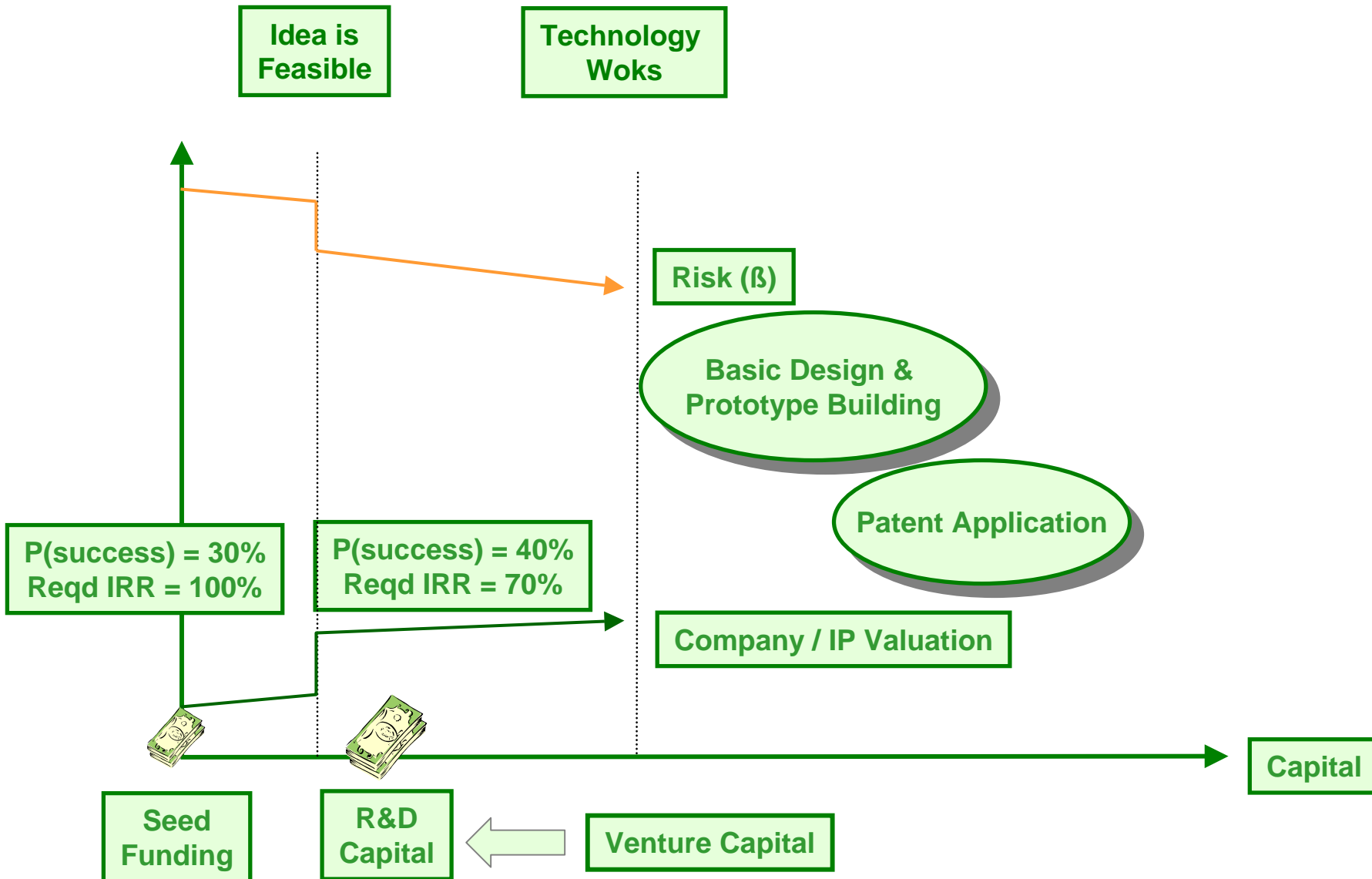


Source: RIS, India

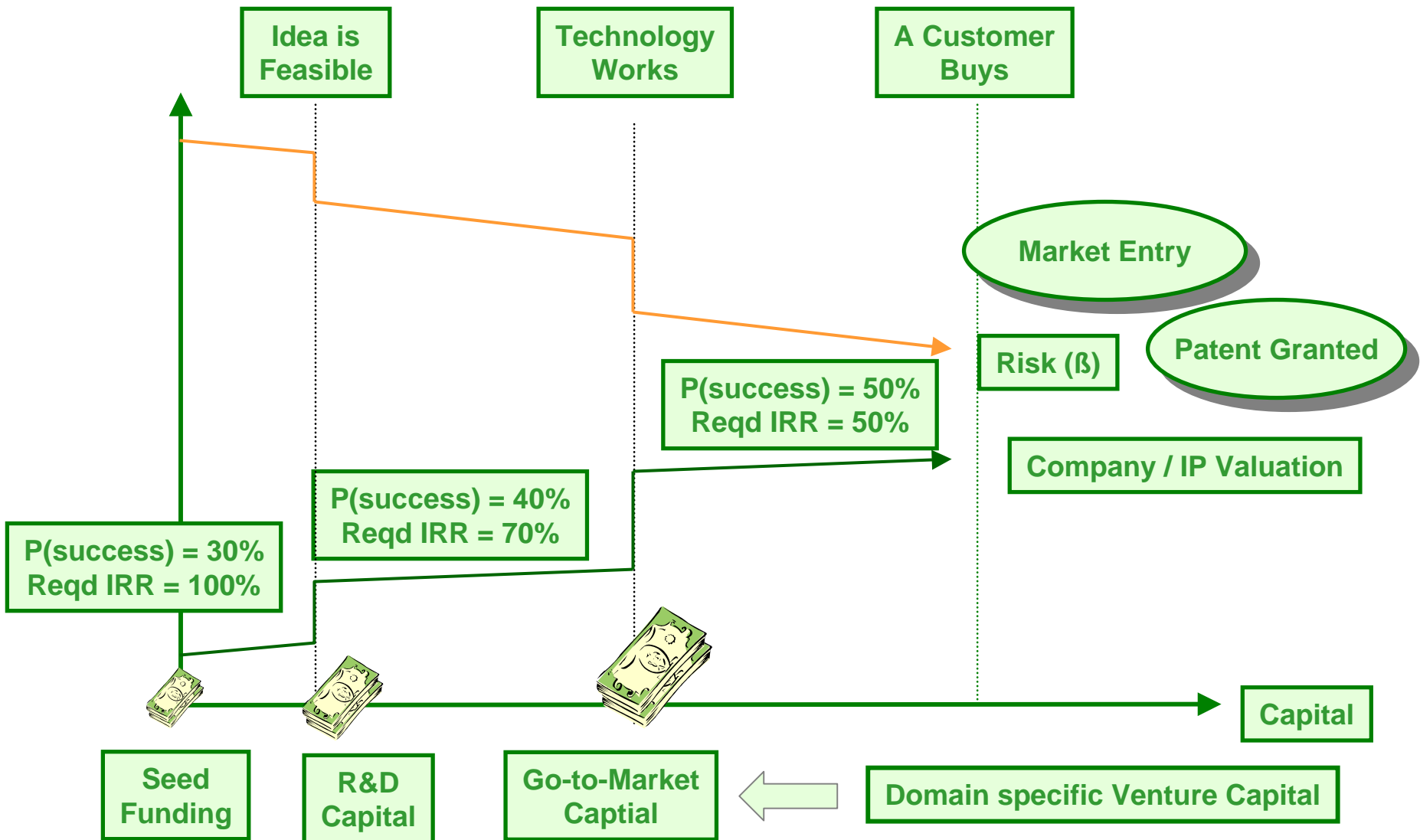
Funding to Milestones - 'Venture Capital Model'



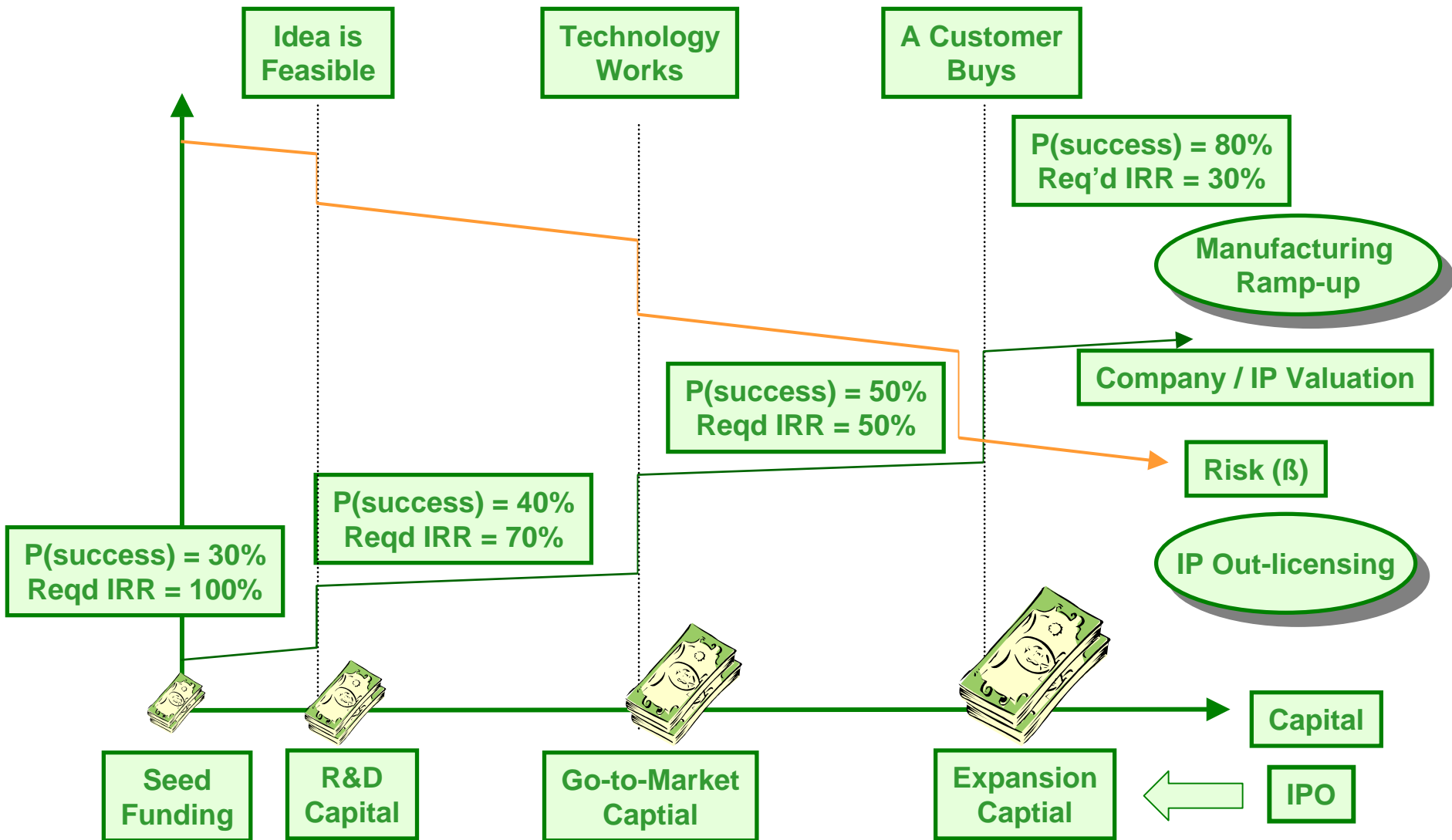
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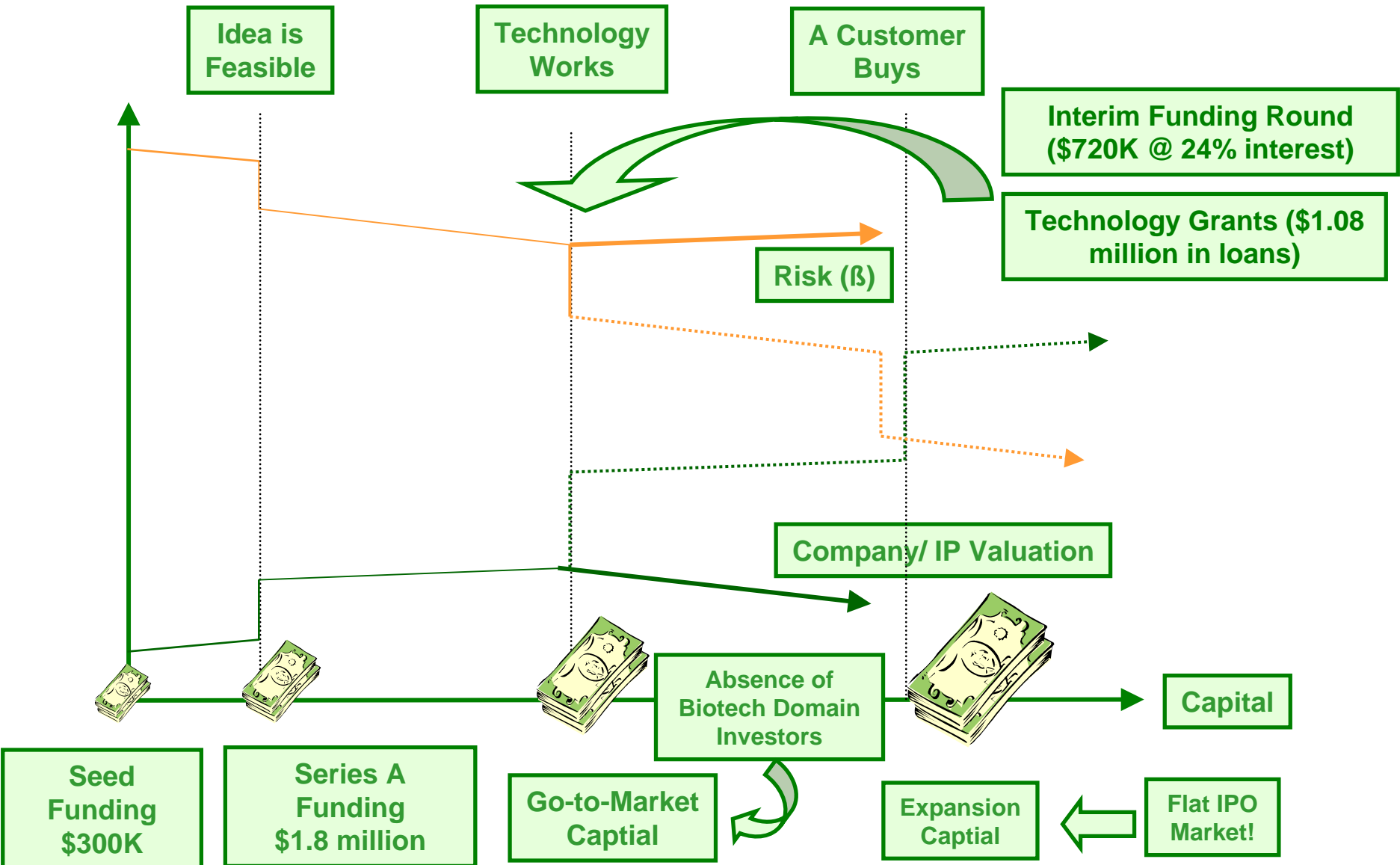
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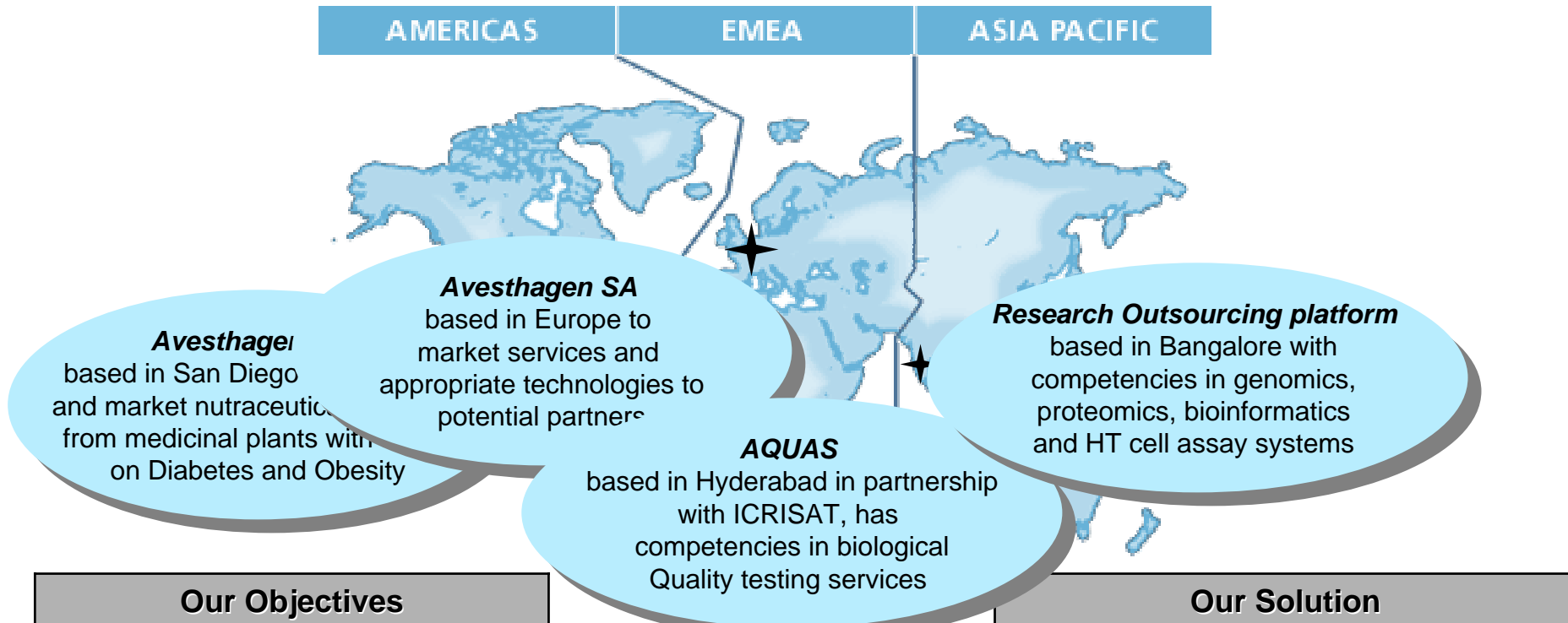
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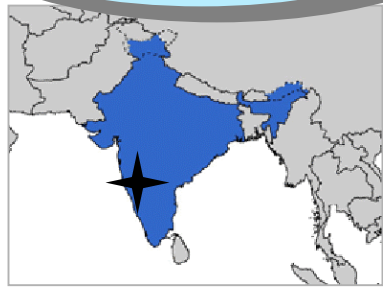
Funding to Milestones – ‘Avesthagen Experience’



Global Model for Biotechnology in India

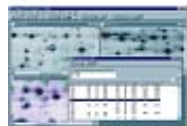


Our Objectives
Leverage India's low cost-structure and access to skilled scientists as a key competitive advantage
Enable the valuation of IP and therefore the company at global standards
Establish close access to markets and clients in the US and EU
Un-fettered access to the capital markets in the US and EU

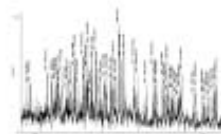
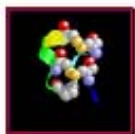
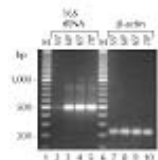


Our Solution
Establish an integrated biotechnology platform as a "Research Outsourcing" Station
Establish subsidiaries and Joint Ventures with partners in the US and Europe enabled through project-based funding
The subsidiary / JV shares the IP on products and technologies and markets them.
Research is outsourced to the "Research Outsourcing" Station in Bangalore

Research Process Outsourcing™ - RPO™



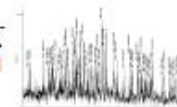
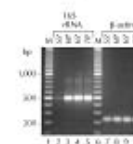
Entire spectrum of activities in a biotechnology lab



Transformation led by “brainware” leverage



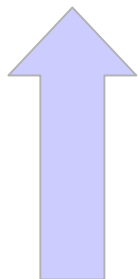
Strategic in-house lab



- Limited access to venture capital means that R&D services and IP development must balance each other for the company to be sustainable.
- RPO™ is characterized by a shared “objectives” based relationship,
- Avesthagen participates in the firms R&D and IP development process,
- Avesthagen helps the firm to broaden competency and manage R&D cost through leveraging the *India Advantage!*

Revenue Model using RPO™

High Risk / Large
invested capital



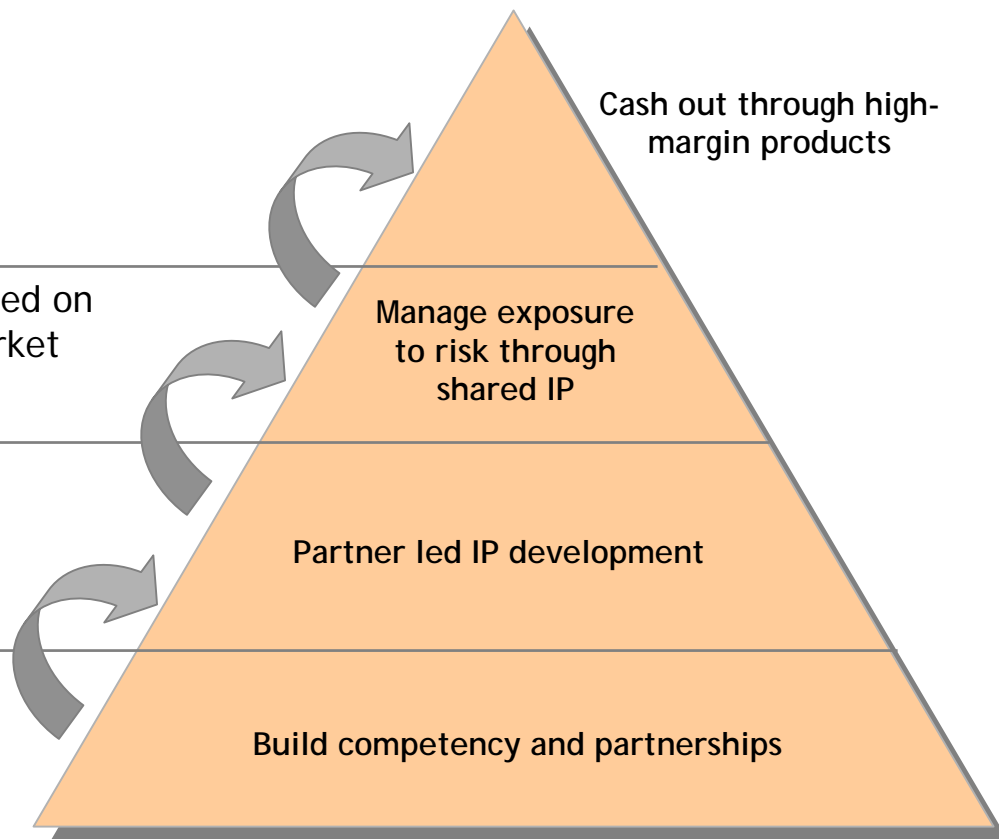
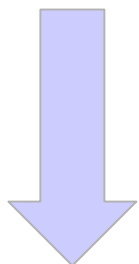
Out-licensing / Royalties

Co-development of IP based on
existing portfolio and market
opportunities

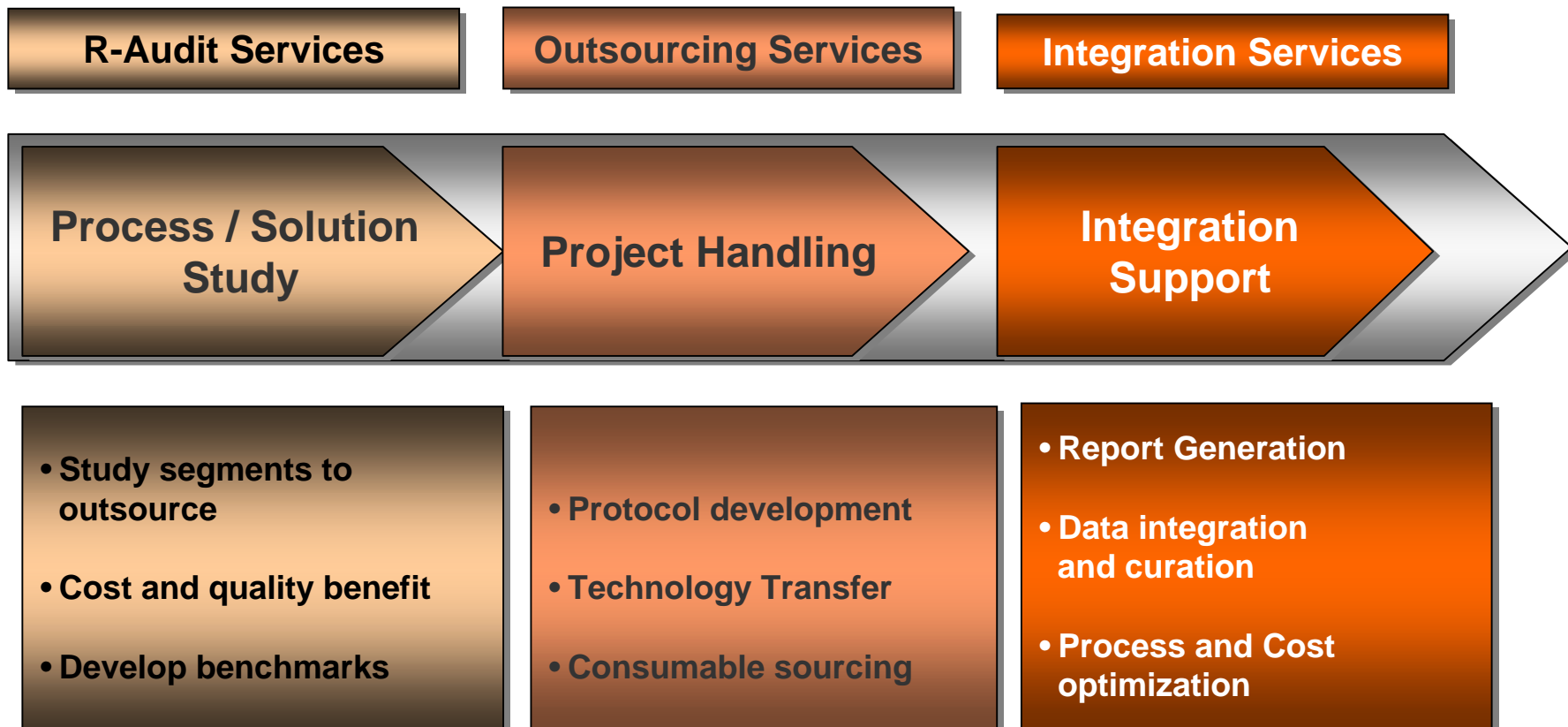
Strategic investment led
R&D

RPO™ - fee for service

Low Risk / Small
invested capital



RPO™ Process Flow



Competencies at Avesthagen that enable the RPO™ Model

Functional Genomics

- Customized cDNA libraries
- Whole Genome Sequencing
- Genotyping and DNA fingerprinting
- MAS, Marker development

Validation of *in-silico* systems

- Gene Annotation
- Protein-Protein interaction
- Data Curation and functional classification

Population Genomics

- Disease databases
- Drug target discovery
- Screening for drug response

Biotherapeutics

- Proteome profiling - 2D-GE, Comparative gel analysis and PMF
- Cloning, Expression, Purification, Prep-HPLC for lab scale production of bioactive proteins
- *Pharming* - Transformation for expression of therapeutics in plants
- Development and validation of protocols

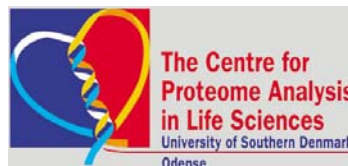
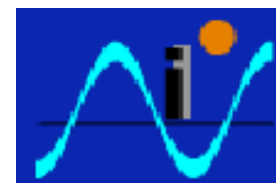
Current Partners – RPO™ Works!



Imperial College
OF SCIENCE, TECHNOLOGY AND MEDICINE



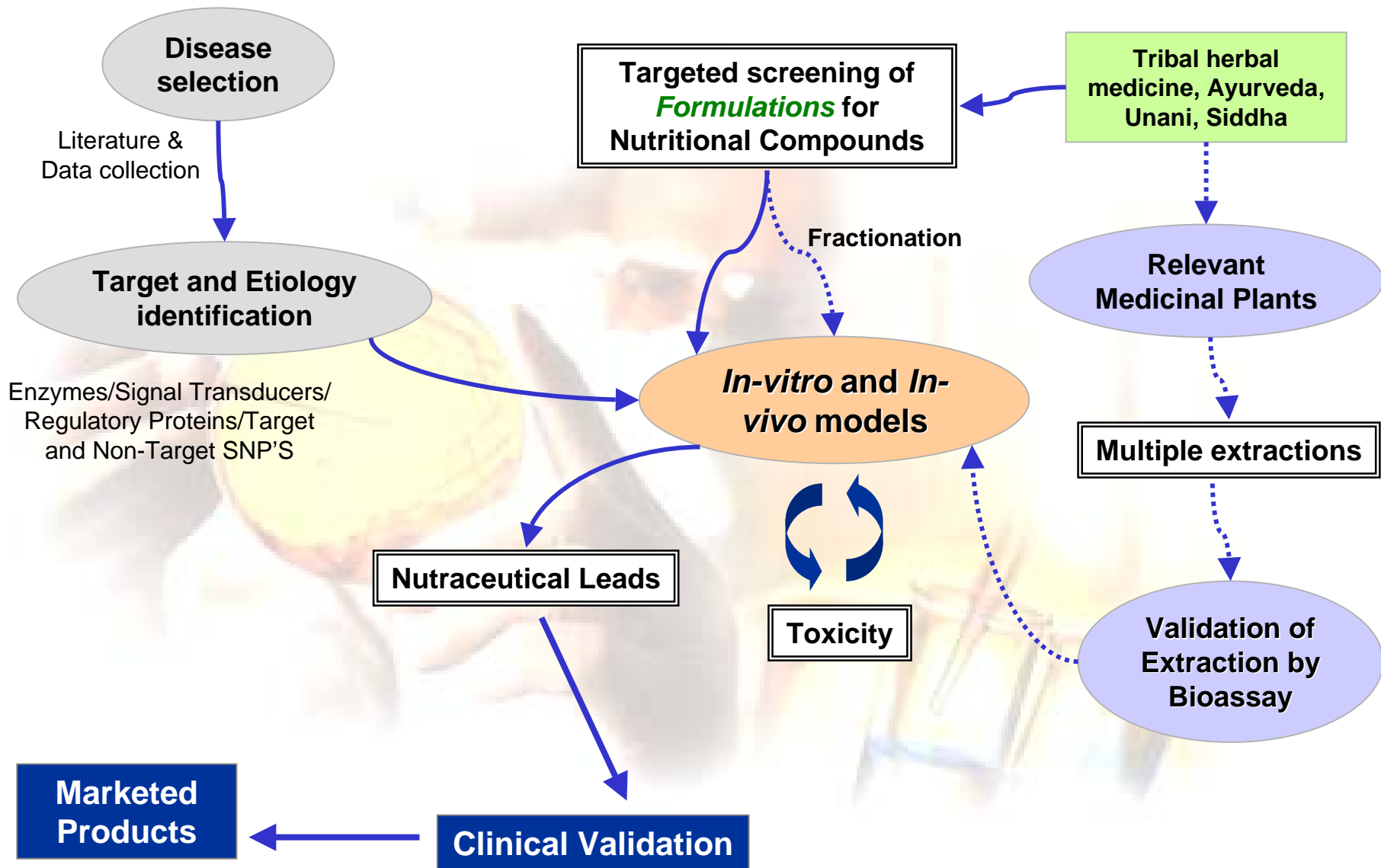
ICRISAT



Current Product Development Programs at Avesthagen

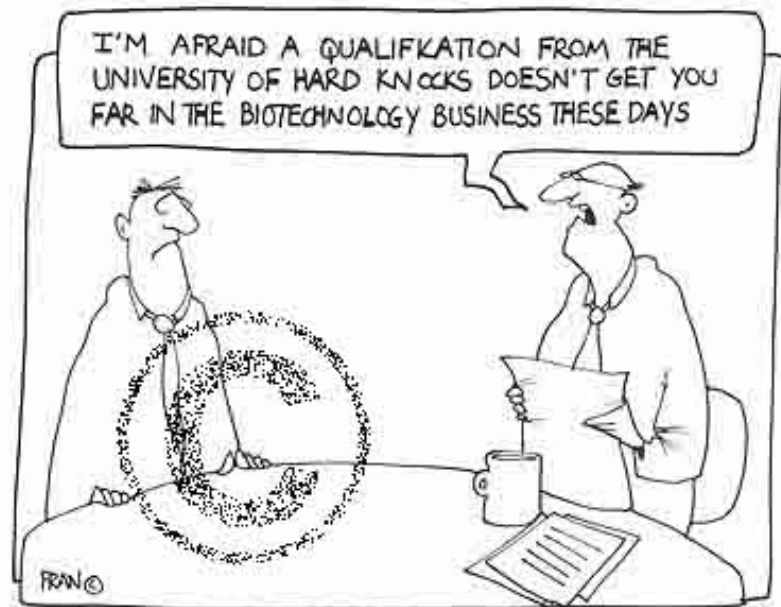
- Discovery of nutritional compounds that are effective against diabetes and obesity from Indian medicinal plants and formulations described in traditional medicine. The product development effort is supported by the International Bank for Reconstruction and Development (IBRD) program.
- Genetic Manipulation of *Helianthus annuus* L. for production of Docosahexaenoic acid (DHA). In partnership CSIR labs in Goa (NIO) and Jammu (RRL) under the NMITLI program.
- Identification and Characterization of Aroma Genes from Basmati Rice.

Nutraceutical Discovery Program



Conclusion

- Biotech companies in the region need to have the best breed of technology, product & services and IPR strategy.



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“Frankly sir, we’re tired of being on the cutting edge of technology.”

Thank You!