

Presentation on A*STAR and ETPL

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SINGAPORE'S R&D AND INNOVATION LANDSCAPE

AN OVERVIEW OF SINGAPORE



Physical Land Area: 716 sq km

Population: 5.4 million

3.8 million (71.2%)

Singapore Residents

Literacy Rate: 96.5% (Aged 15 & above)

74.9% of those aged 25-34 years
have tertiary qualifications

2014 GDP S\$390.1bn (US\$307.9bn)

Real Growth : 2.9%

Per Capita GDP: S\$71,318
(US\$56,284)

Independent since 9 August 1965

SINGAPORE'S COMPETITIVE ADVANTAGE



A Regional Hub:

For half the world's population
(3.4 billion people)

For markets worth US\$21.2 trillion
(S\$26.8 trillion)

A Well Connected Global City

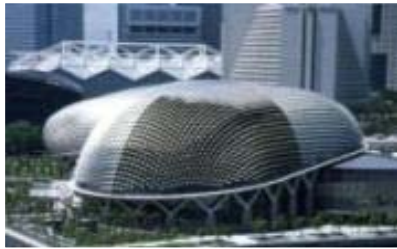
English Speaking

Cosmopolitan Environment

Most Liveable City in Asia

Singapore, A Vibrant Business Hub

ASIA



SINGAPORE

Ease of Doing Business

Rank	Country
1	Singapore
2	New Zealand
3	Denmark
4	Korea
5	Hong Kong

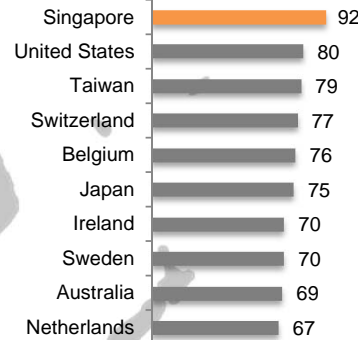
Source: Ease of Doing Business Index (2014), World Bank

Strong IP Protection

Rank	Country
1	Finland
2	Luxembourg
3	Switzerland
4	Singapore
5	New Zealand

Source: Global Competitiveness Report (2015/6), World Economic Forum

Best Labour Force



Source: Labour Force Evaluation Measure (2014), BERI

▶ **7,000**

Multinational Corporations

60% with global or regional headquarters.

▶ **37,400**

International Companies

Including 3,200 from China, 4,400 from India, and 7,900 from ASEAN.

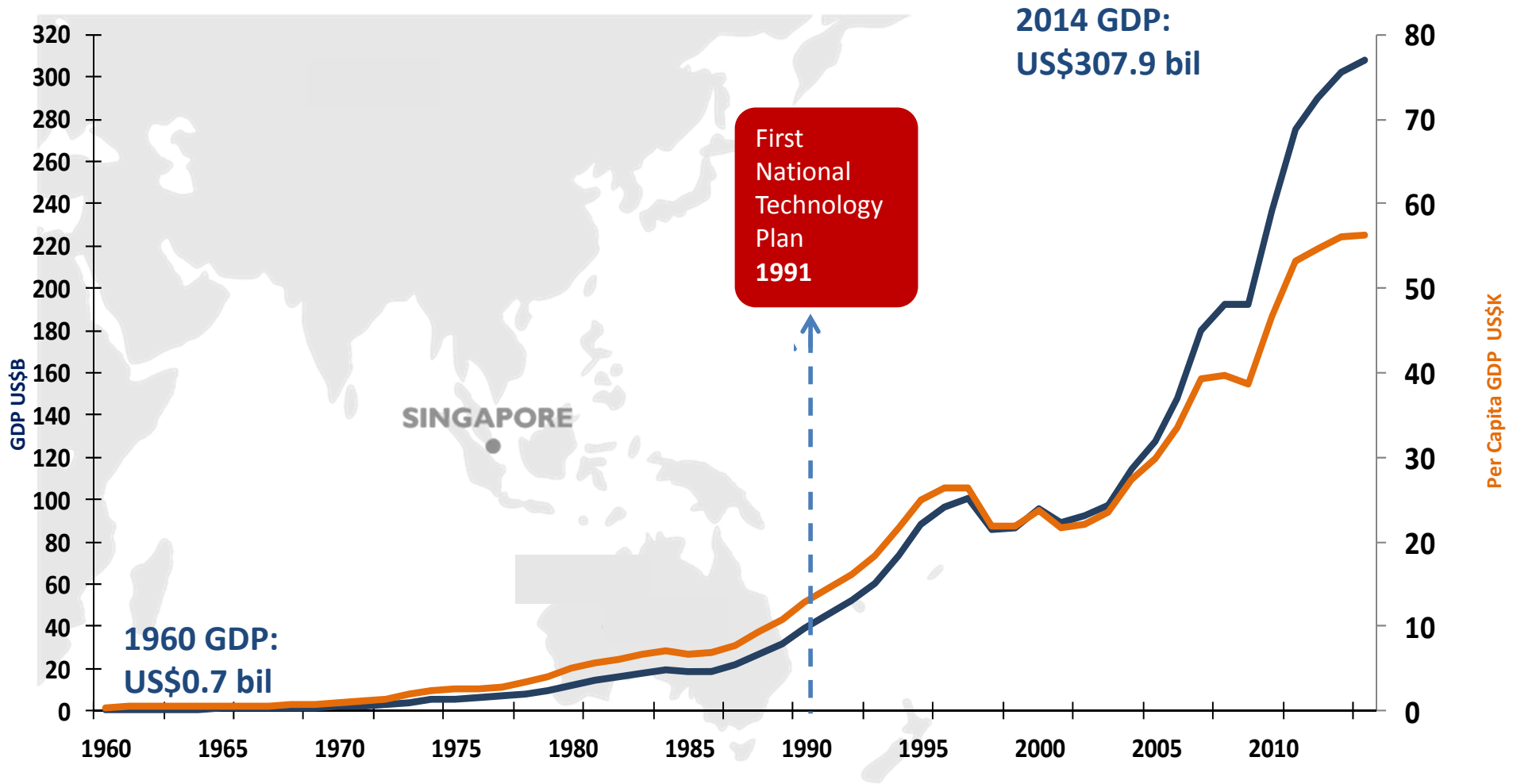
▶ **170,000**

Small & Medium Enterprises

1,000 identified with the goal of growing revenues to S\$100 million.

Source: Accounting & Corporate Regulatory Authority (2Q 2010), Department of Statistics, Economic Strategies Committee

SINGAPORE'S EVOLVING ECONOMY



1960s Labour intensive	1970s Skill intensive	1980s Capital intensive	1990s Technology Intensive	2000... Knowledge & Innovation Based Economy
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Singapore's R&D Framework

Research, Innovation & Enterprise Council



Lee Hsien Loong
Chairman, RIEC
Prime Minister Singapore

FUNDING AGENCIES & MINISTRIES

Ministry of Education 

Ministry of Health 

Ministry of Trade & Industry 

NATIONAL RESEARCH FOUNDATION

 Agency for Science, Technology and Research

 EDB Singapore

 SPRING Singapore

RESEARCH PERFORMERS

Polytechnics & Universities Hospitals A*STAR Research Institutes Corporate Labs

RIE 2015

RESEARCH ▶

INNOVATION ▶

ENTERPRISE

5-year S&T Plans

National
Technology
Plan
(1991-1995)
S\$2 billion

National
Science &
Technology Plan
(1996-2000)
S\$4 billion

Science &
Technology
Plan 2005
(2001-2005)
S\$6 billion

Science &
Technology
Plan 2010
(2006-2010)
S\$13.9 billion

Research, Innovation
& Enterprise Plan
2015
(2011-2015)
S\$16.1 billion



Invest in
basic science for
future innovation



Attract and
develop
scientific talent



Emphasis on
competitive funding



Foster
synergies
in public-private
partnership



Focus on
research with
economic outcome



Support for
technology
commercialisation

SINGAPORE'S RESEARCH ECOSYSTEM



ABOUT A*STAR

MISSION

We advance science and develop innovative technology to further economic growth and improve lives

The Agency for Science, Technology and Research (A*STAR) drives mission-oriented research that advances scientific discovery and technological innovation. We play a key role in nurturing and developing talent and leaders for our Research Institutes, the wider research community, and industry.

Our research creates economic growth and jobs for Singapore. As a Science and Technology Organisation, we bridge the gap between academia and industry in terms of research and development. In these endeavours, we seek to integrate the relevant capabilities of our research institutes and collaborate with the wider research community as well as other public sector agencies towards meaningful and impactful outcomes. Together with the other public sector entities, we develop industry sectors by:

- Integrating our capabilities to create impact with Multi-National Corporations and Globally Competitive Companies;
- Partnering Local Enterprises for productivity and gearing them for growth; and
- Nurturing R&D-driven Start-ups by seeding for surprises and shaping for success.

Our research, in addition, also contributes to societal benefits such as improving outcomes in healthcare, urban living, and sustainability. These serve to enhance lives in Singapore and beyond.

VISION

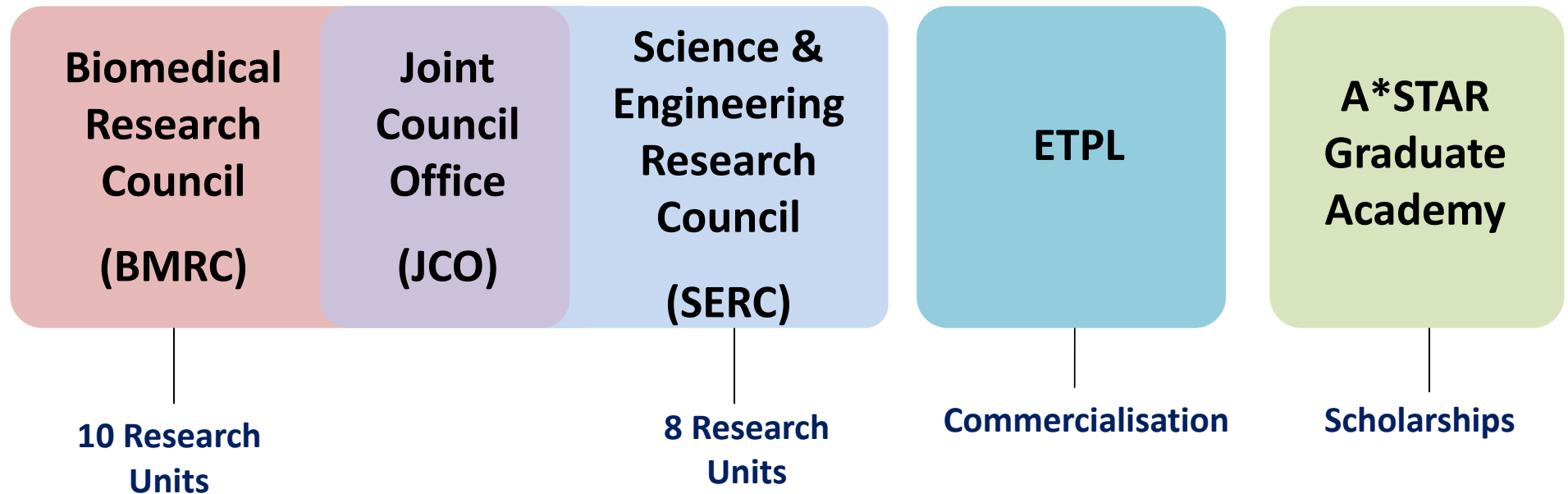
**A global leader in science,
technology and open innovation**

The Agency for Science, Technology and Research (A*STAR) is a catalyst, enabler and convenor of significant research initiatives among the research community in Singapore and beyond. Through open innovation, we collaborate with our partners in both the public and private sectors, and bring science and technology to benefit the economy and society.

We aspire to be a global leader in Science, Technology and Open Innovation.

A*STAR

Mission: We advance science and develop innovative technology to further economic growth and improve lives



>5,400 Staff
>4,500 Researchers, Engineers and Technical Support Staff
>40% of whom come from 60 countries

A*STAR'S VALUE PROPOSITION

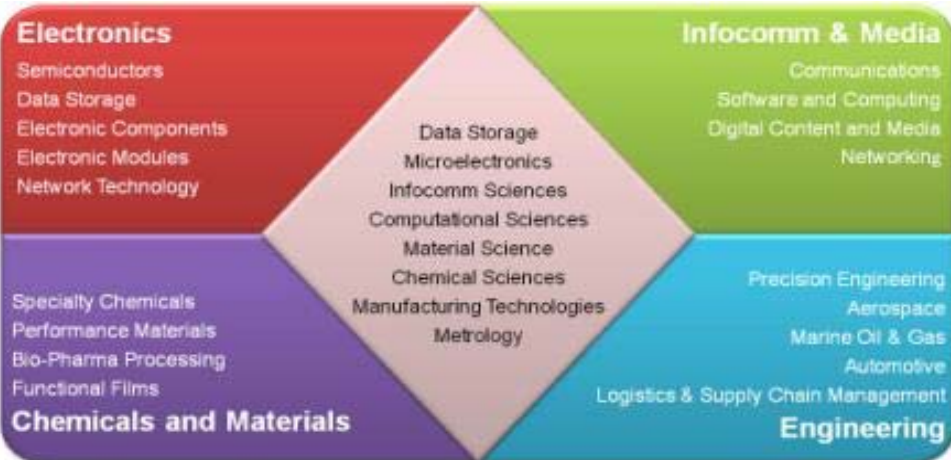


R&D IN A*STAR

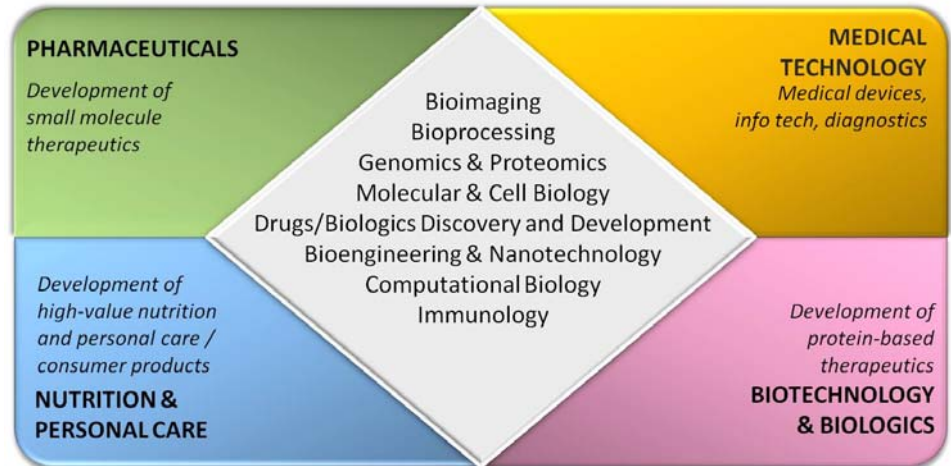
Fostering Science and Intellectual Capital

- Oversees R&D in SG through 18 Research Institutes (RIs) and Centres
- Seed novel scientific discoveries leveraging on A*STAR's spectrum of capabilities under Joint Council

Physical Sciences & Engineering



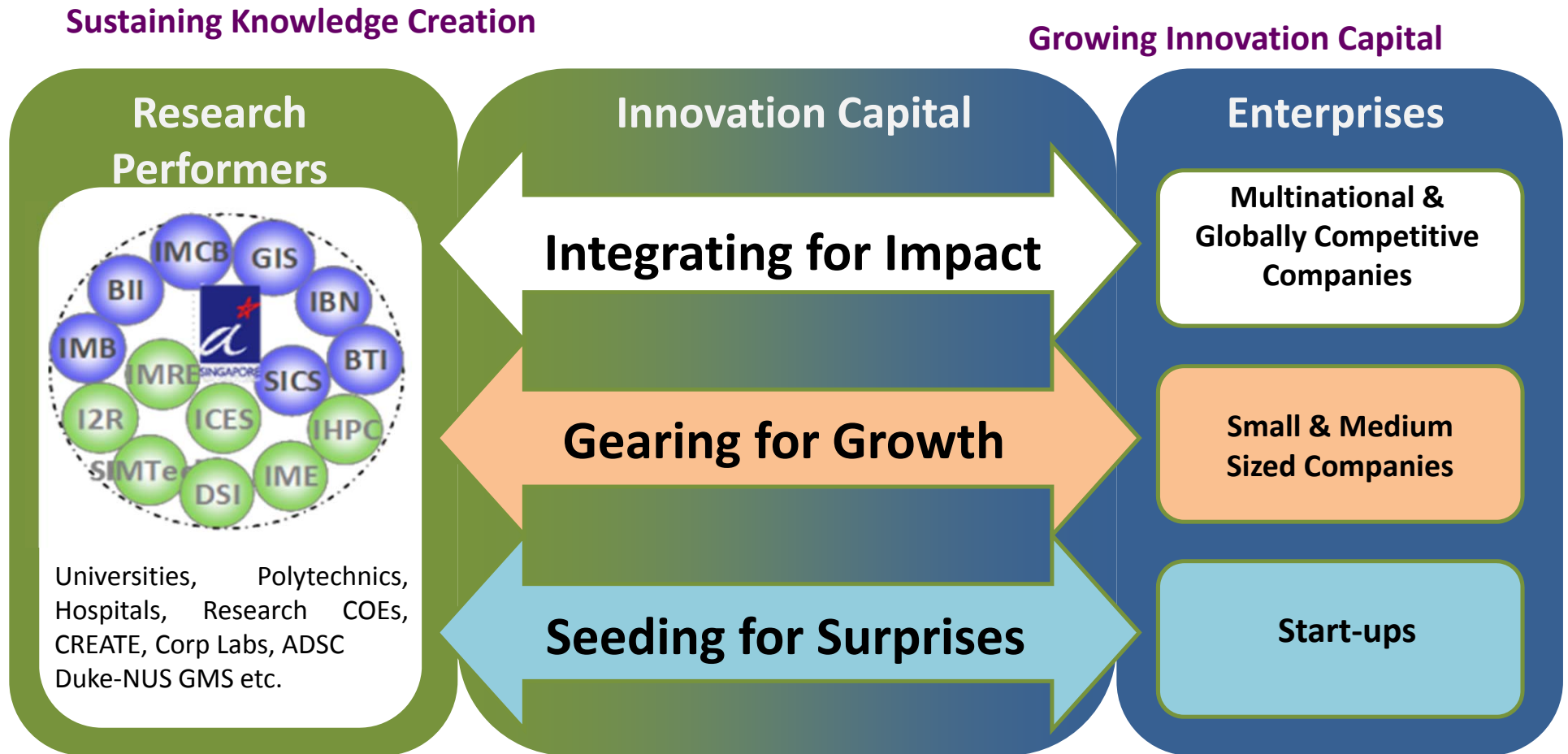
Biomedical & Biological Sciences



INDUSTRY ENGAGEMENT AT A*STAR

A*STAR'S STRATEGY MAP

Emphasis on supporting private sector growth through public-private partnerships



INTEGRATING FOR IMPACT

Complex Partnerships

- Step change in our partnerships with companies.
- More public-private partnerships at bigger scale and across more domains eg. P&G MRCA, MERCK MRCA, Lloyd's Register, Rolls-Royce (ARTC), Nestlé.
- Corresponding increase in complexity of partnerships.
- When managed well, complexity of partnerships increases barrier to competition.

Master Research Collaboration Agreement

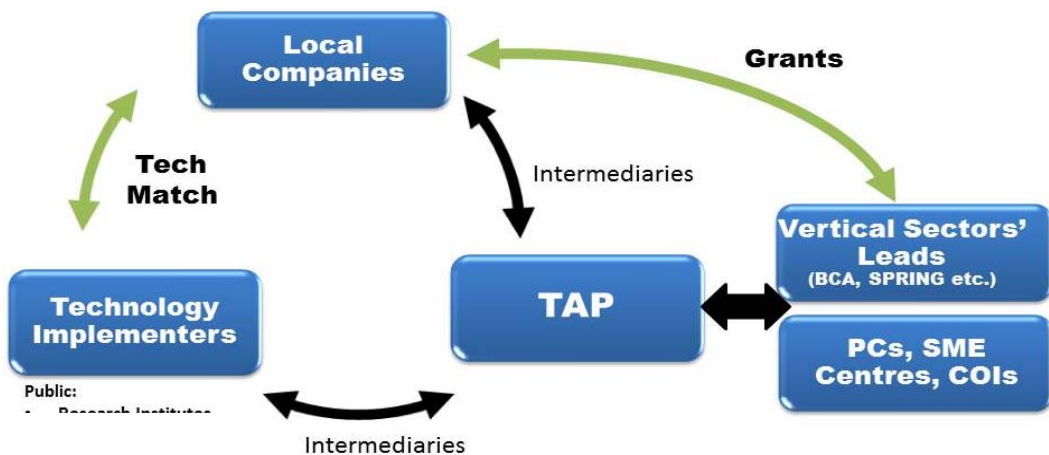


Joint Labs with Companies



GEARING FOR GROWTH

Technology Adoption Programme (TAP)



EpiGen Consortium



3 Countries
5 Member institutes
30 Principal Investigators
200 Scientists

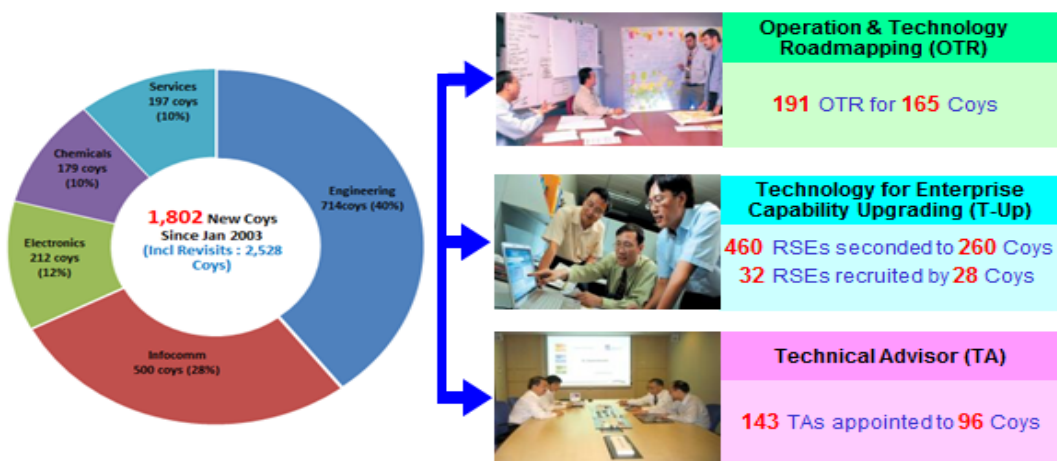


Good Food, Good Life

Multiple industry Collaborators



Growing Enterprises through Technology Upgrade (GET-Up)



Aerospace Consortium

To drive innovation and sustain competitiveness of local aerospace industry through R&D

R&D Focus

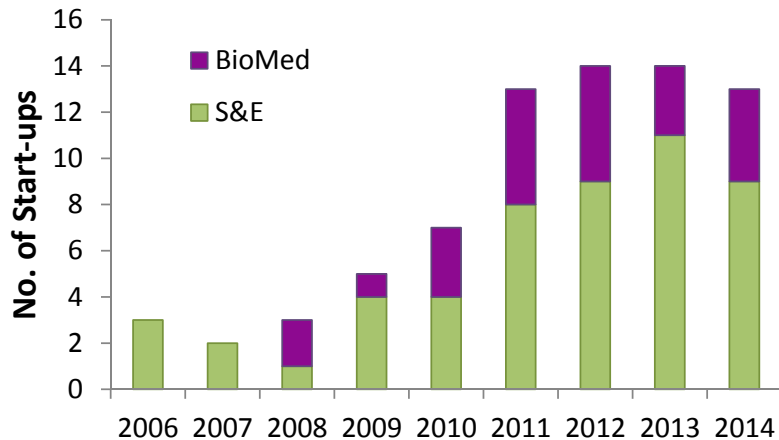
- Computational Modelling & Dynamics
- Advanced Materials
- Manufacturing Processes & Automation
- Inspection & NDT
- Information & Communication



ETPL

CREATING GROWTH, ENHANCING LIVES A*STAR

STEERING FOR SUCCESS



- Increasing focus on start-ups as key to diversifying and spurring innovation in the economy¹.
- Local entrepreneurial landscape is taking off.
- Active start-ups in Singapore jumped by almost 60% to 39,000 from 2005 to 2012¹.
- Rate of start-up formation at A*STAR has more than doubled.
- A*STAR can and should make a difference in the research-based hi-tech start-ups.



TALENT AT A*STAR

TALENT IN A*STAR

- More than 1,300 Scholarships to develop Singaporean PhD talent since 2001
- Over 450 scholars have completed their PhD/postdoctoral training and are contributing to Singapore's Research, Innovation and Enterprise (RIE) ecosystem
- Over 1,900 students from over 70 countries awarded PhD scholarships or research attachments in Singapore
- **A*STAR has over 4,400 researchers, engineers and technical support staff; over 40% coming from 60 countries**

Supporting Early Career Development for Young PhDs

- Post-doc opportunities at top institutions & corporate laboratories around the world
- Conducive scientific career development environment at A*STAR
- Multiple career pathways at A*STAR and beyond



Sustaining Singaporean PhD Talent Flow

A*STAR Undergraduate & PhD Scholarship Programmes



Building a Robust & Diverse Talent Pool

Awards & Attachments for International Students



Promoting Science to Young People & Building a Pipeline of R&D Talent

A*STAR Science Awards & Youth Science Programmes

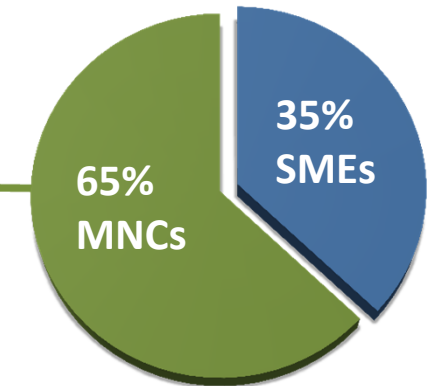


A*STAR'S PERFORMANCE

Singapore's Lead Government Agency for Economic Oriented R&D

>1,700

INDUSTRY PROJECTS A YEAR
5 INDUSTRY PROJECTS A DAY



>2,800

PAPERS
PUBLISHED A
YEAR

>200

LICENSES A YEAR
4 LICENSES A WEEK

>240

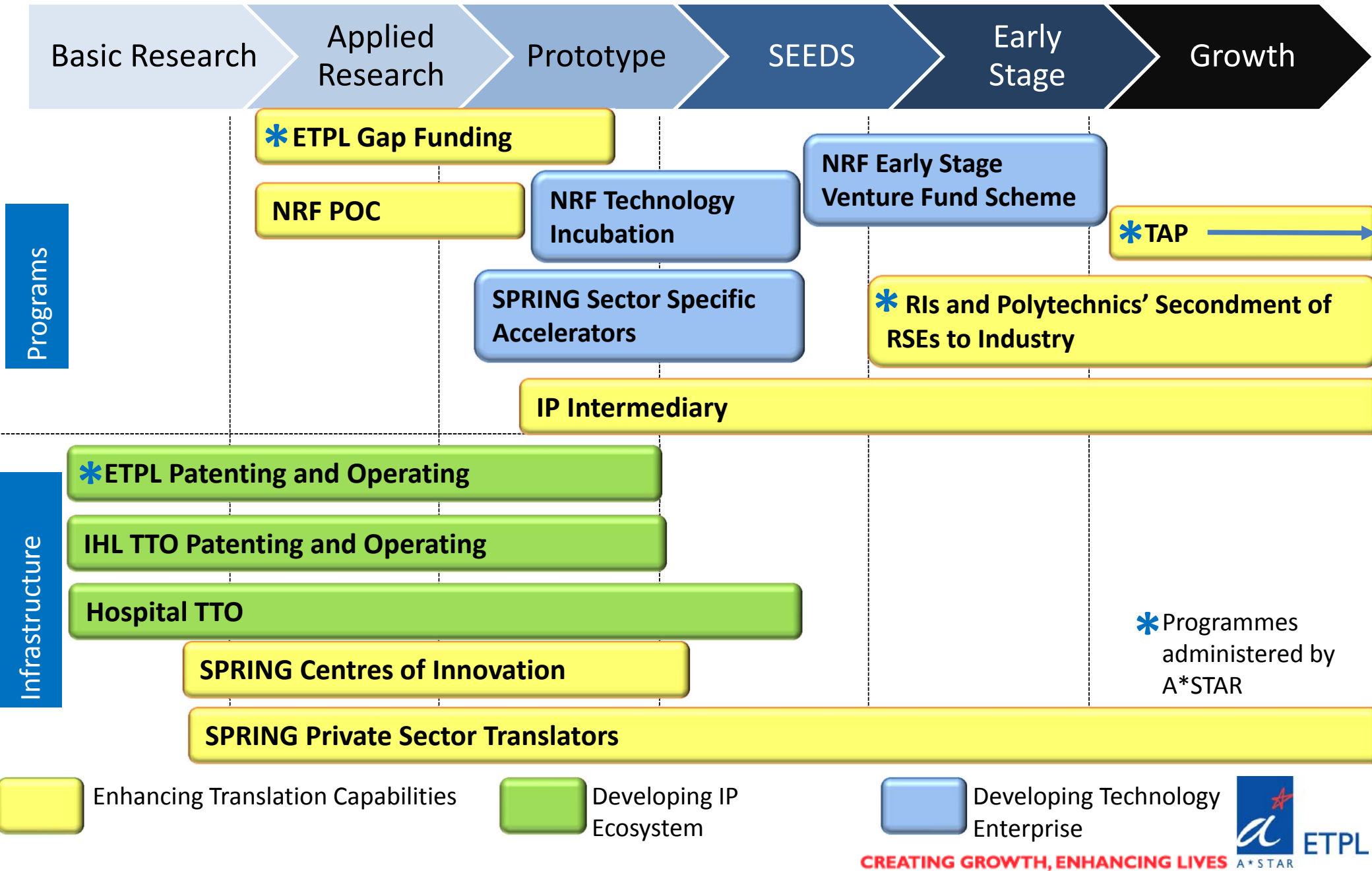
PATENTS FILED
A YEAR



*A*STAR 2013 Performance*


INNOVATION AND ENTERPRISE

INNOVATION AND ENTERPRISE (I&E) LANDSCAPE



GAP FUNDING TO INCUBATE TECHNOLOGY

Increasing Technology Premium

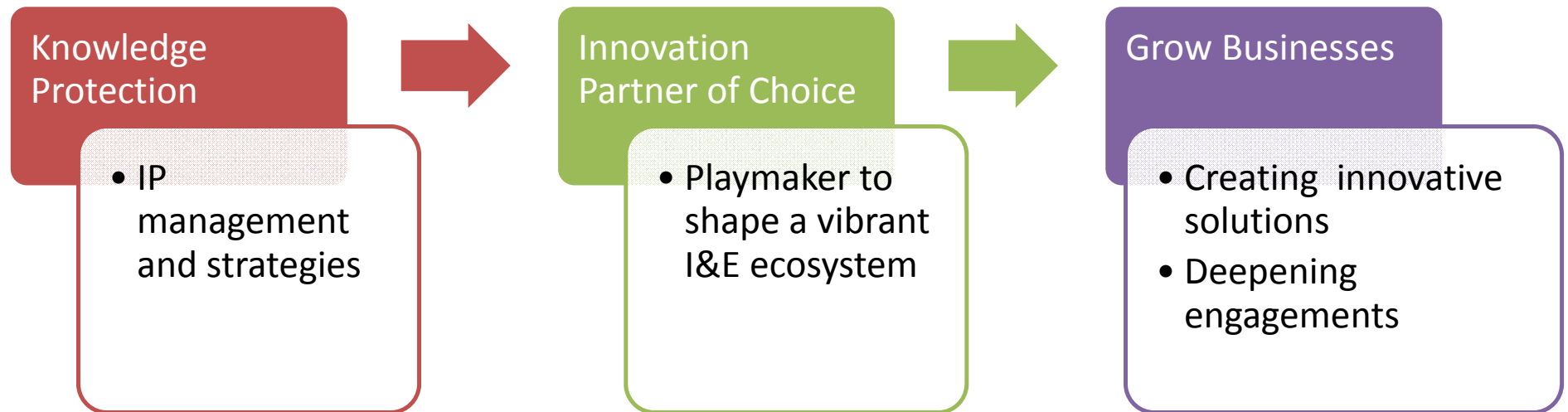
	Conceptualization			Concept Refinement	Technology Development		System Development & Demonstration		Production & Deployment
TRL#	1	2	3	4	5	6	7	8	9
Relative level of Technology Development	Basic Principles observed	Concept Formulated	Proof of Concept	Component/or system validated in lab environment	Lab scale, similar system validated in relevant environment	System/sub system or Prototype demonstrated in relevant environment	Full scale/ Prototypical system demonstrated in operational environment	Actual Systems Qualified through test and demonstration	Mission proven
A*STAR's Focus	Output from Research Institutes' core fund*								
Industries				Product development; customers' validation and mass production					

* Depending on technologies and RI

** Could be extended depending on market needs

A*STAR BRIDGING THE GAP

A one-stop innovation partner of choice to grow business through technology commercialization in Singapore and beyond



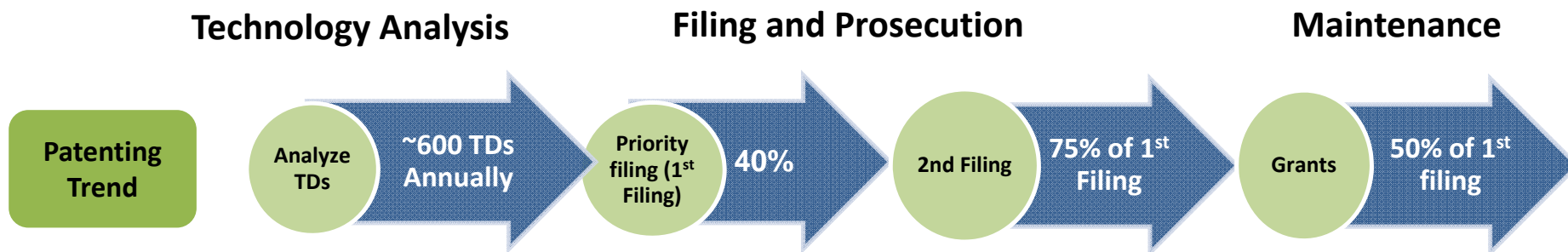
IP MANAGEMENT

From Technology Disclosures (TDs) to Patents

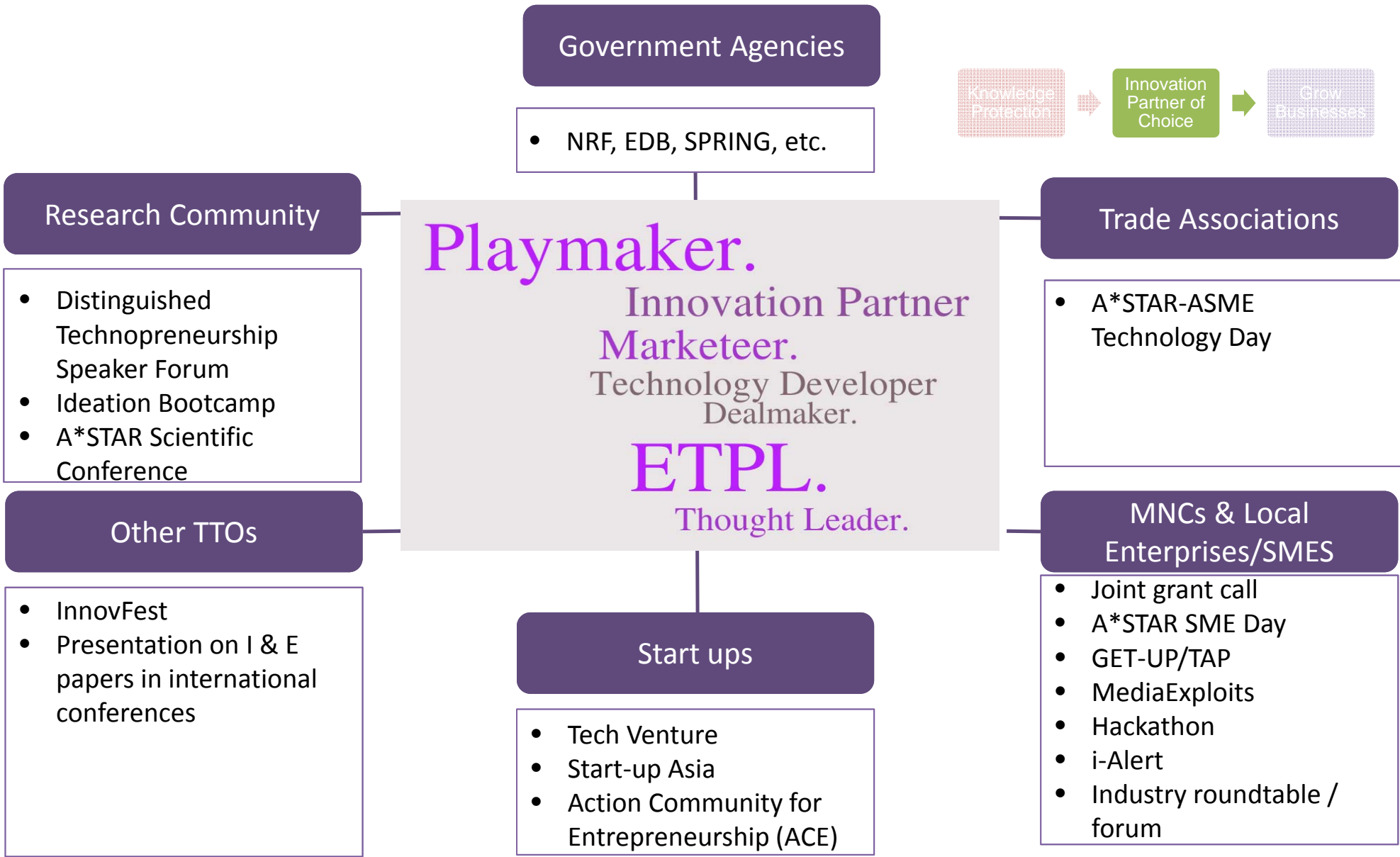


Using the Portfolio Analysis and Commercialisation Evaluation (**PACE**) Matrix to:

- Strategise the commercialisation plan
- Prioritise the commercialisation effort
- Manage the IP portfolio by deciding the scope of patent required



PLAYMAKER TO SHAPE A VIBRANT I&E ECOSYSTEM



Playmaker.
 Innovation Partner
 Marketeer.
 Technology Developer
 Dealmaker.
ETPL.
 Thought Leader.

DIAGNOSTICS DEVELOPMENT HUB

Increasing Product Output



2. Research Performers



1. Clinicians



DxD HUB

Regulatory Navigation
 ISO Design and Development
 Clinical Validation
 Talent Management
 Competency Creation
 Market Strategy
 Industry Standardisation

Productisation

Co-ordinate, manage and perform product focused regulatory and development activities to transform ideas into market ready products



4. Market



Products



Reagents/
Diagnostics Assays



Rehabilitation



PoC / Lab Analysers



Imaging Tools



Surgical Tools

3. Local Co-development Partners



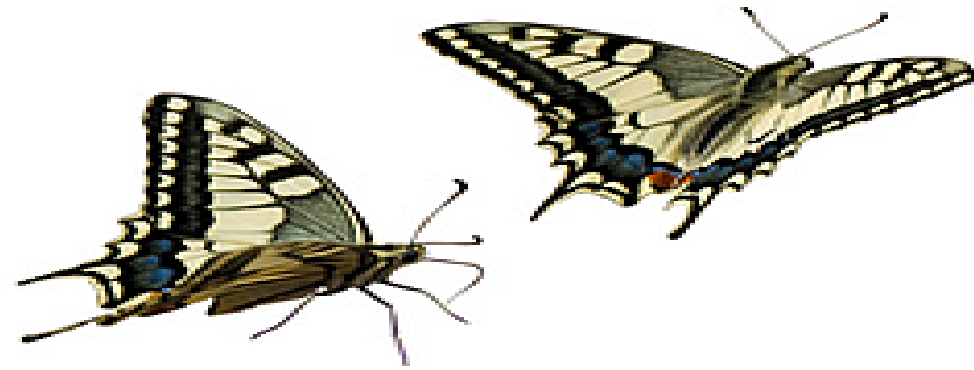
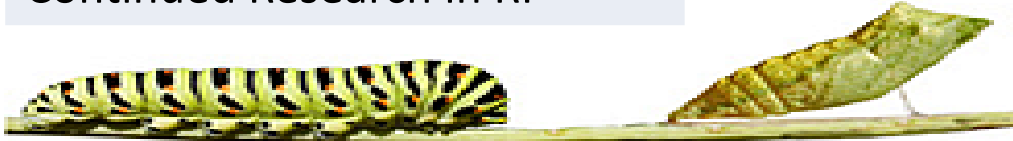
SHAPING START-UPS FOR SUCCESS



Pro Start-up Policies

Conducive Culture

Continued Research in RI



Active Engagement

Nurturing Technopreneurs

Mentoring Program

Active Involvement

Accelerate Growth through strategic pipeline

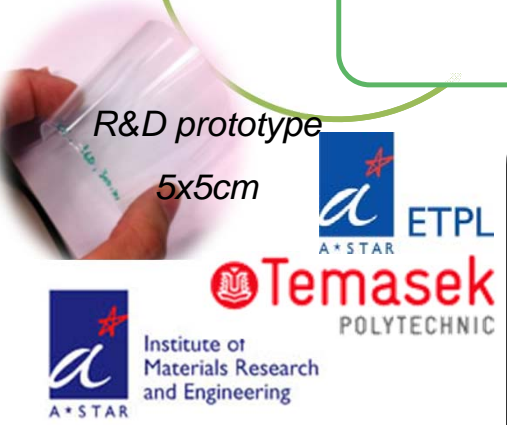
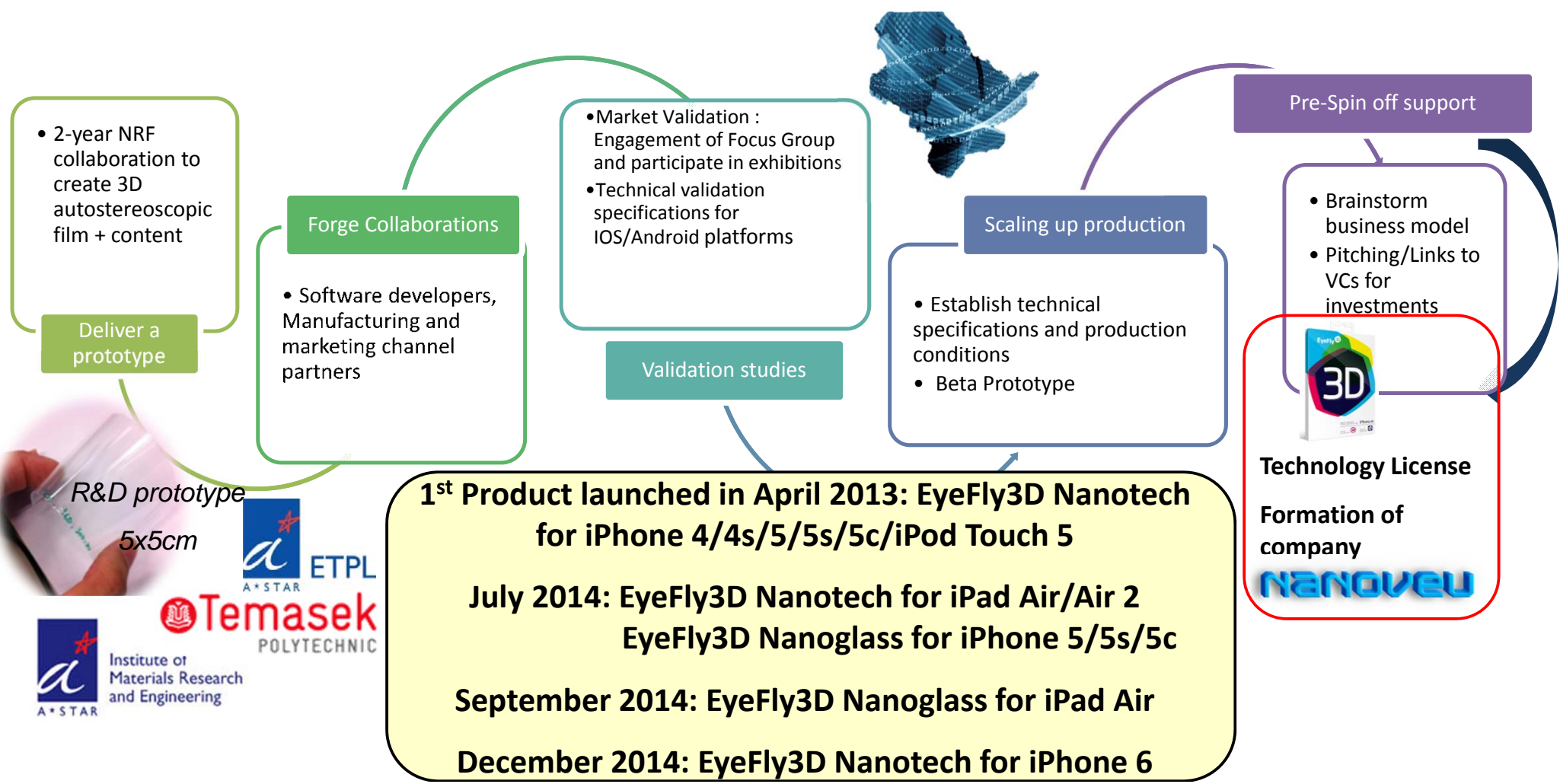
Experts involved in entrepreneurial process

NANOVEU

Shorten Time To Market



Gap Funding



THANK YOU