INSTITUTE FOR SPORTS RESEARCH

An International Collaboration between

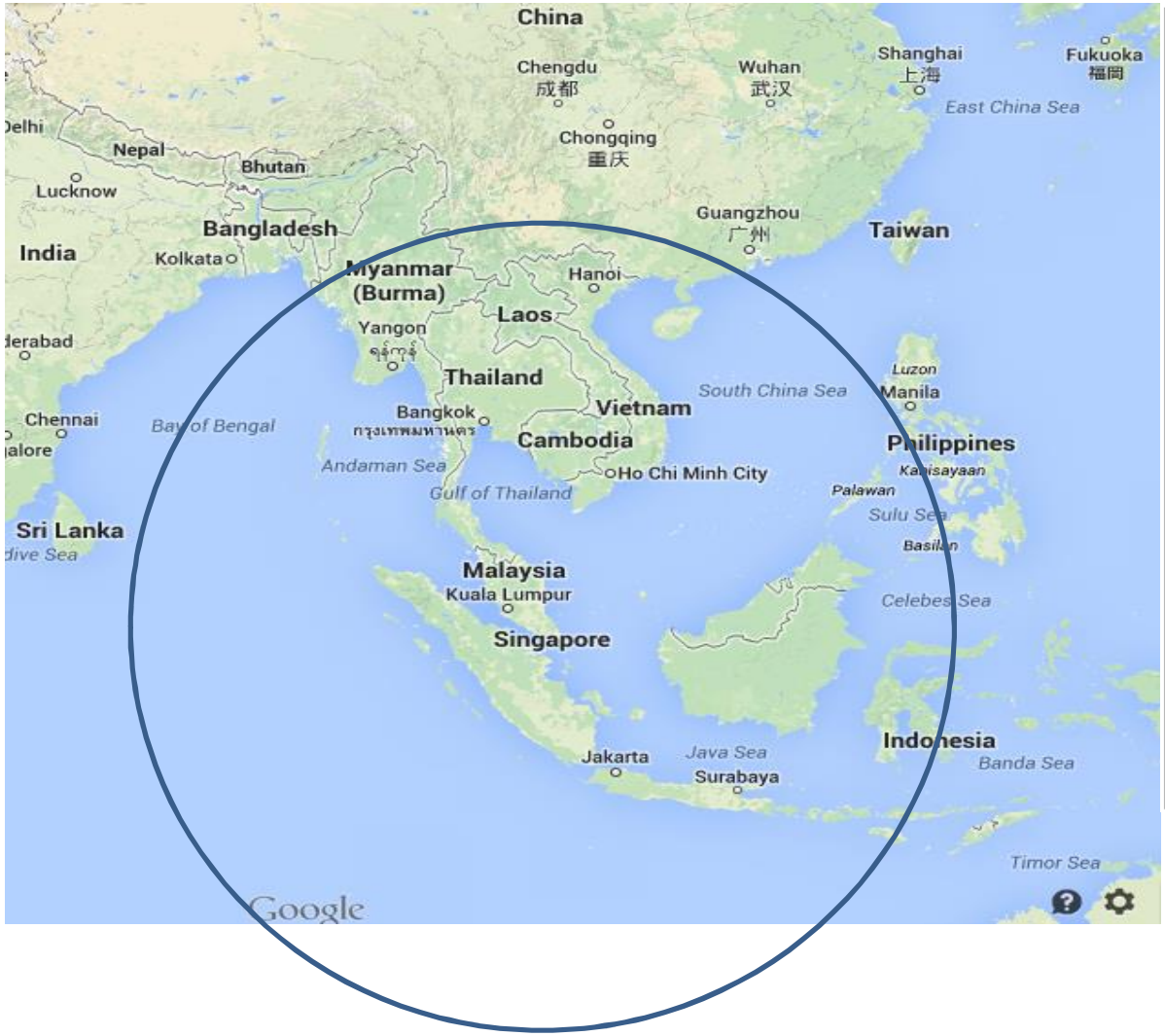
NANYANG TECHNOLOGICAL UNIVERSITY

Loughborough University

“ From Manufacturing to R&T in Asia: Singapore the new sports industry hub in Asia-Pacific »

EPSI / SPORALTEC Voiron, France, June 13th 2014

ASEAN = 600 M hab @ 2h+ flight around Singapore

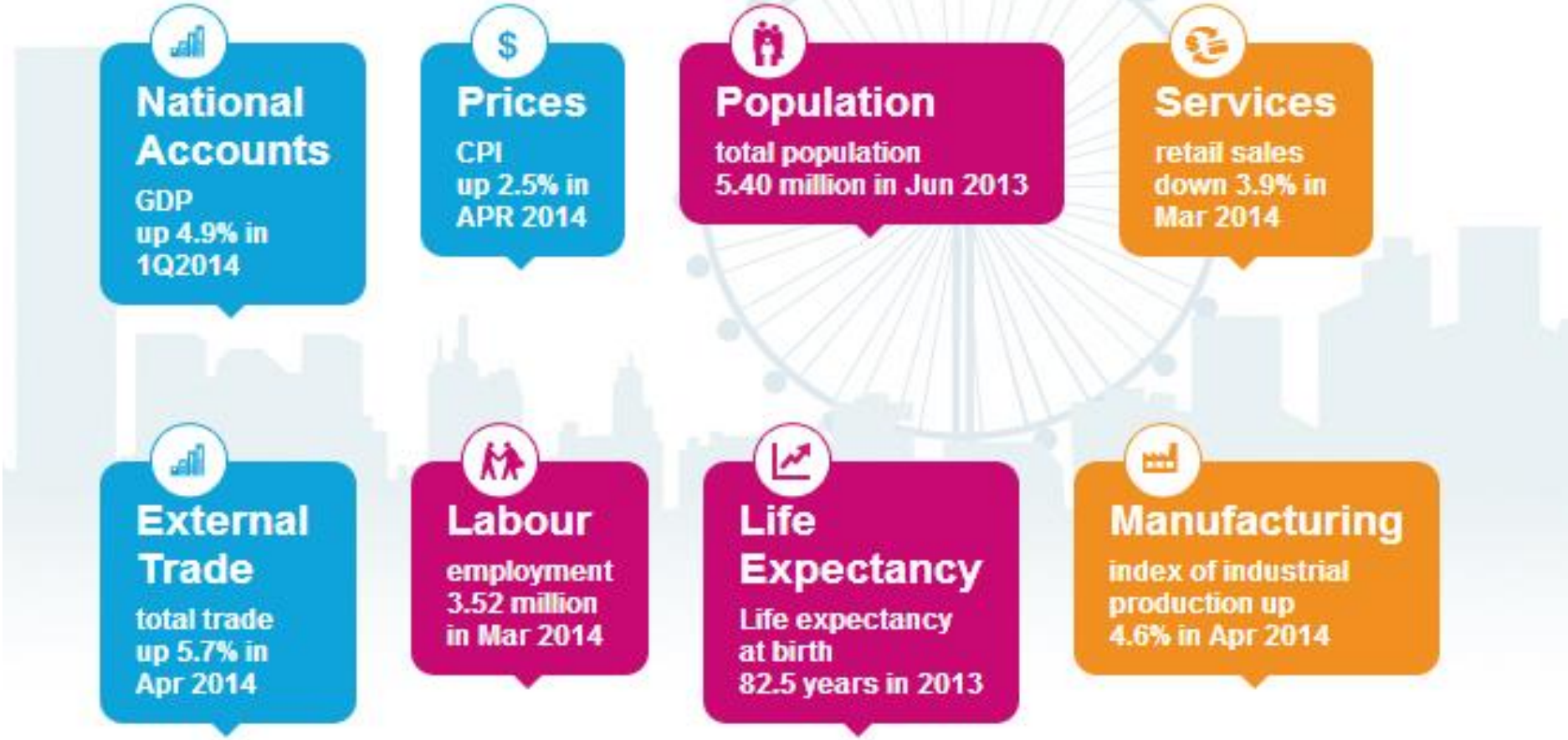


Rank	Country	Population in millions		GDP Nominal millions of USD		GDP Nominal per capita USD	
—	***World***	*7,013.42*		*71,707,302*		*10,200*	
—	*European Union*	*502.56*		*16,584,007*		*32,518*	
—	United States	314.18		15,684,750		49,922	
—	China	1,354.04		8,227,037		6,076	
—	Japan	127.61		5,963,969		46,736	
—	***ASEAN***	***615.60***	***100.0***	***2,305,542***	***100.0***	***3,745***	***100.0***
—	South Korea	50.01		1,155,872		23,113	
1	Indonesia	244.47	*39.7*	878,198	*38.1*	3,592	*95.9*
2	Thailand	64.38	*10.5*	365,564	*15.9*	5,678	*151.6*
3	Malaysia	29.46	*4.8*	303,527	*13.2*	10,304	*275.1*
4	Singapore	5.41	*0.9*	276,520	*12.0*	51,162	*1,366.1*
5	Philippines	95.80	*15.6*	250,436	*10.9*	2,614	*69.8*
6	Vietnam	90.39	*14.7*	138,071	*6.0*	1,528	*40.8*
7	Myanmar	63.67	*10.3*	53,140	*2.3*	835	*22.3*
8	Brunei	0.40	*0.1*	16,628	*0.7*	41,703	*1,113.5*
9	Cambodia	15.25	*2.5*	14,241	*0.6*	934	*24.9*
10	Laos	6.38	*1.0*	9,217	*0.4*	1,446	*38.6*

SINGAPORE

LATEST KEY INDICATORS

5,4 M hab = 3,8 M Sing + 1,6 M Foreigners



More stats available at http://www.singstat.gov.sg/

Key reasons for considering Singapore

- Geo-Strategic location for sales and supply chain operations
- Politically and socially stable
- Respect and protection of IP
- #1 place in the world for easy and safe business without corruption
- High level of education ➔ local talents available
- R&D hub with most of international firms already established
- Financial incentives offered by government (EDB) : tax on profit < 20%,

  400% tax base reduction on R&D investments…

Why implementing sports R&D in Singapore ?

- To be **inside the fastest and largest growing sports market** area to operate your business in the region and understand the needs.

- To **understand the Asian specifics** : morphology, physiology, psychology, education, cultural background and reference, purchasing behavior, society organization…

- To benefit from the **unique and broad interdisciplinary research platform** at NTU which no industrial company can afford in house.

Singapore Government's Holistic Sports Vision

VISION2030
LIVE BETTER THROUGH SPORTS

"Becoming the leading Sports Hub in Asia-Pacific"

Sports Participation

Sport SINGAPORE

Engaging different segments of community to be involved in sports; nation-building through sports.

Sports Excellence

Adopting long-term development plan for athletes to succeed at international sporting events.

Sports Industry

EDB singapore

Anchoring sports businesses, attracting sports tourism; city branding. R&D =

ISR INSTITUTE FOR SPORTS RESEARCH

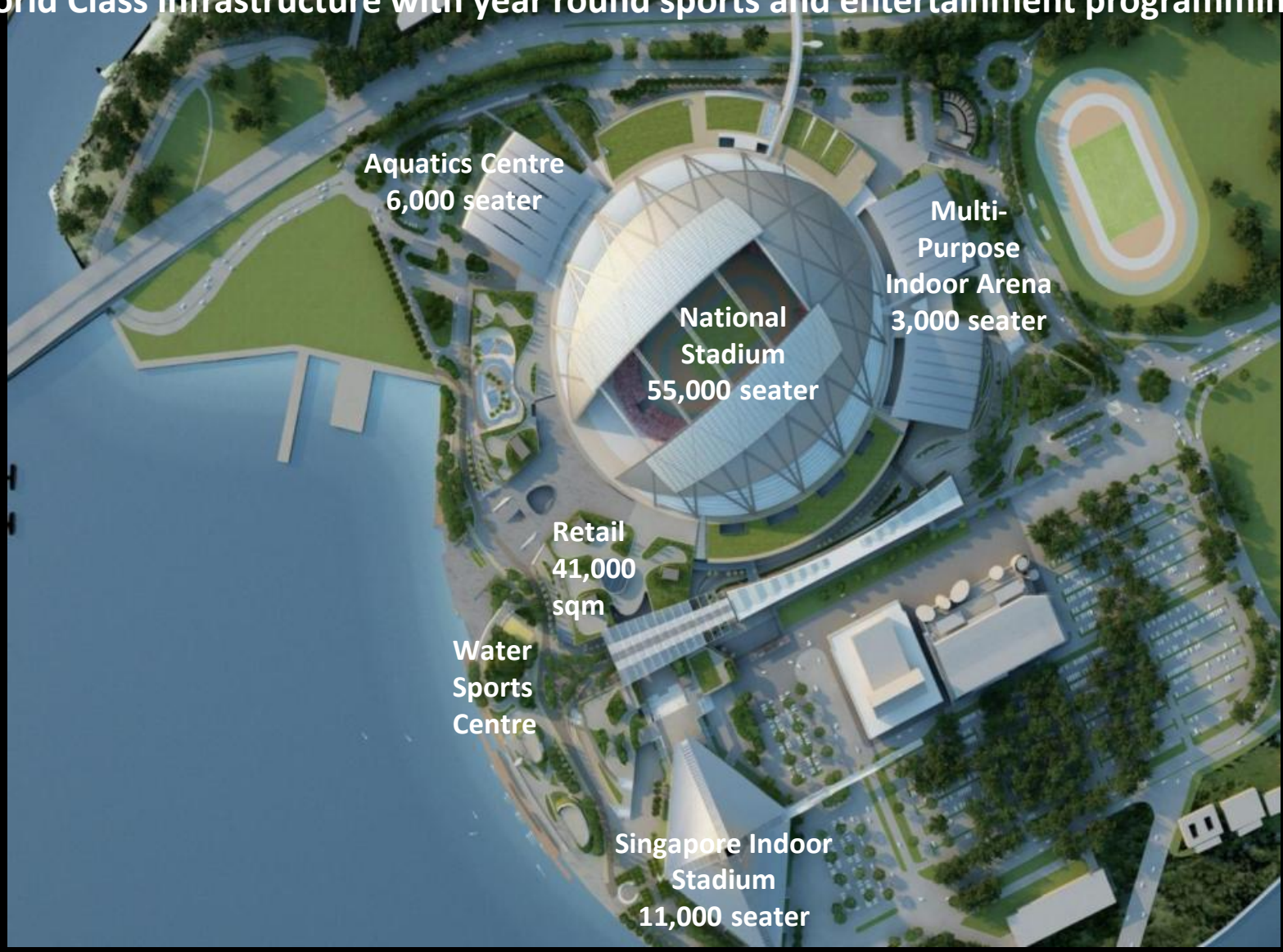
The Value of Sport for Singapore :

Develops resilient & healthy Singaporeans
Contributes to a dynamic society & economy
Strengthens friendships with other nations
Bonds people of different backgrounds, cultures and races

Singapore Sports Hub

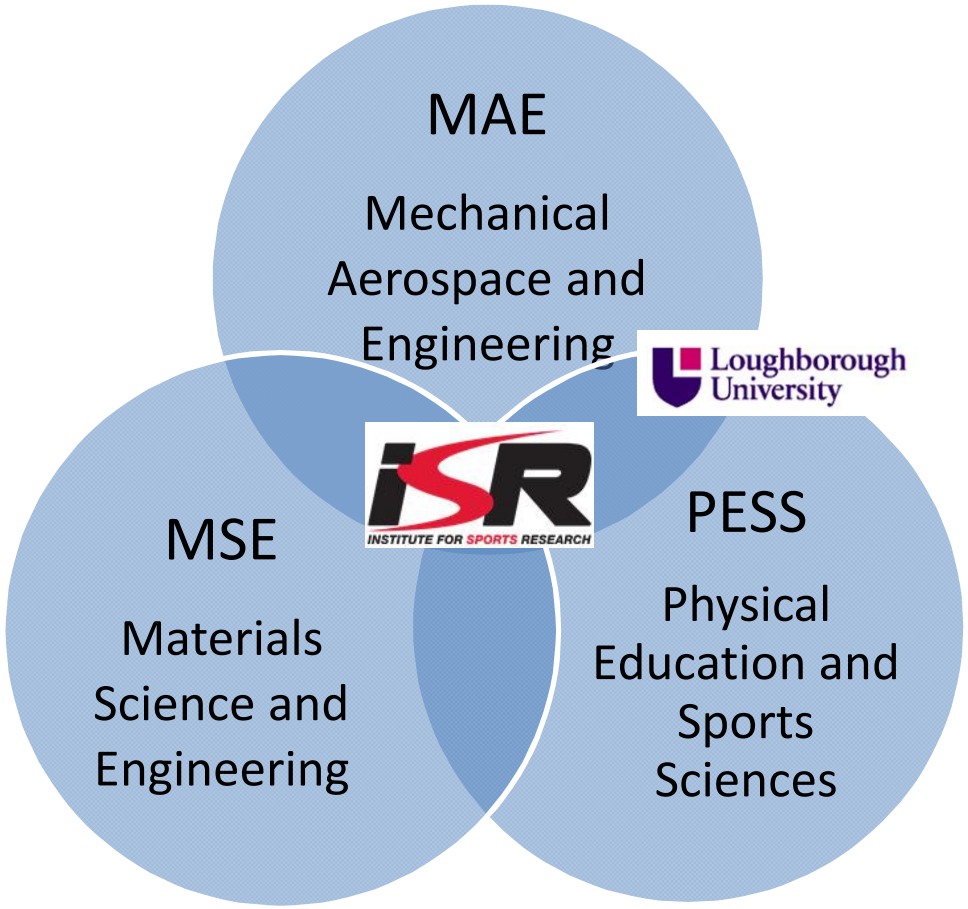
Asia's most inspiring venue for sports and entertainment **Opening July 2014**

35ha World Class Infrastructure with year round sports and entertainment programming



NANYANG TECHNOLOGICAL UNIVERSITY

3 NTU Schools + Loughborough University



Vison / Mission / Values

➢ Our Vision :

To be the leading international Sports R&D center in Asia-Pacific that constantly delivers impactful innovations through cutting-edge research and strong collaboration with stakeholders.

➢ Our Mission :

To imagine new possibilities offered by science and technology to create sports solutions and inspire the sports market through collaborative and interdisciplinary research support.

➢ Brand Values : *IMAGINE . INNOVATE . INSPIRE*

4 Key Drivers

interdisciplinary

Breakthrough are coming from research **cross cutting the traditional disciplinary verticals**.

applied R&D

Sports Industry is driven by athletes endorsement, retail, product design, marketing stories and short product cycles which lead to quickly **apply downstream research to innovation** and no fundamental research.

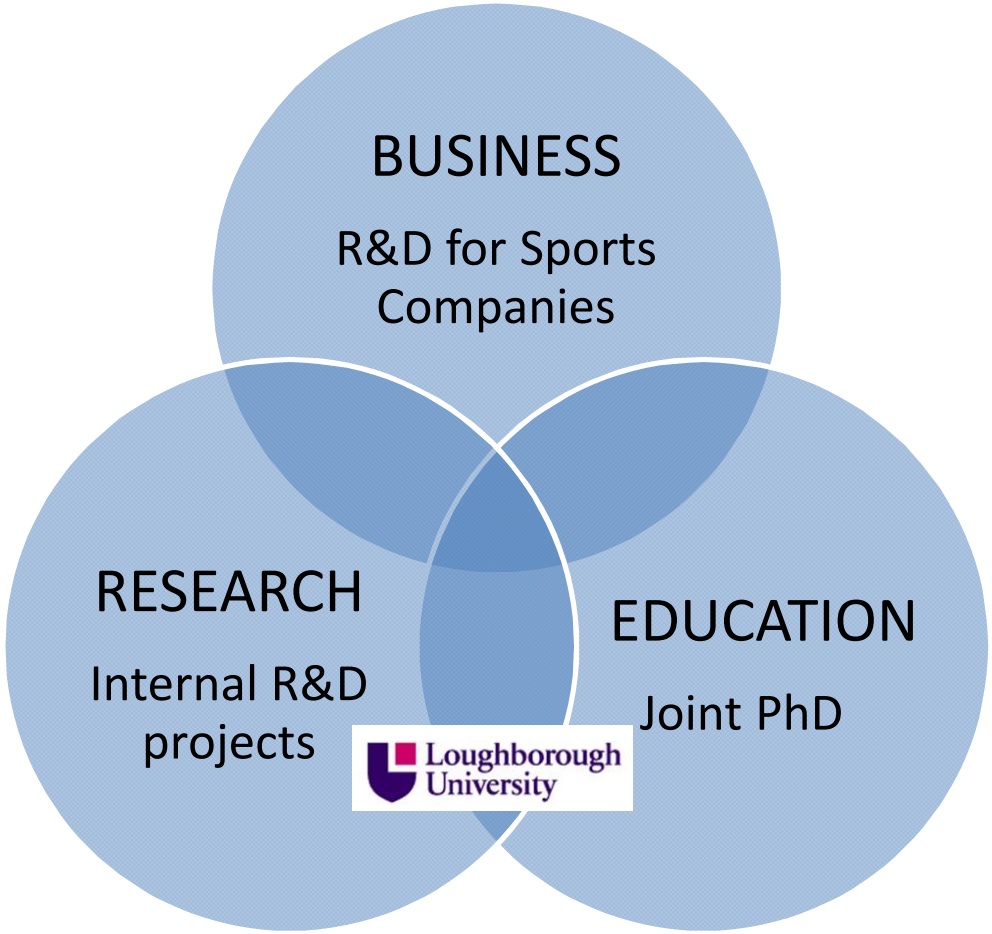
disruptive product innovation

Incremental innovation and in-line product innovation is managed by internal resources of sports companies and ISR aims to partner with advanced research team to come up with real breakthrough.

open innovation hub

Innovation can surge from many places around the world, thus ISR must **attract and welcome external innovation** to **combine** with other technologies, to further **develop** with inter-disciplinary research, to **facilitate access to market** with ISR business expertise and wide industry network.

3 Activities



Action's Scope

Innovative sports products and sports science

1. **Sports products engineering** : Equipment, Apparels, Footwear, Accessories …

2. **Sports sciences** : Physiology, Biomechanics, Nutrition, Psychology, key contributors
   - Å to better product engineering
   - Å to athlete performance health & well being
   - Å to injury prevention

+ **Sports surfaces :** Artificial Turf only

+ **Sports communication :**
   - Å solutions enhancing media broadcast possibilities
   - Å embedded electronics improving user experience

Resources Allocated

- A team of **70 persons**
- Around **US $ 32 M budget over 5 years (2011-2016)**
- **1000 sqm** dedicated research and office space

7p in Management Team :

Executive Director + 2 Deputy Directors from MSE and MAE + Admin Manager + Assistant
2 R&D Programs Directors : HARD & SOFT

11 Full Time R&D Staff (will double by June 2016):

6 R&D Project Managers (Post Doc & Engineers)
1 Sports Product Designer, 2 Researchers making a Part Time PhD, 2 Lab Technicians

15 Part time leading faculties (will double):

8 Professors from MSE (School of Materials Science & Engineering)
6 Professors from MAE (School of Mechanical & Aerospace Engineering)
1 Sport Sciences Coordinator (School of Physical Education and Sports Science)

30 PhD Students and 56 by June 2016 : US $ 12 M invested in research thesis

4 R&D programs matching the industry

Multi-disciplinary resources

- **Advanced Materials (MSE)**

  Nanomaterials, Advanced structures, Functional Materials, Energy Storage, Eco/Sustainable Development…

- **Engineering Techs (MAE)**

  Mechanical engineering, Product design, Additive Manufacturing, Fluids Dynamics, Modeling, Simulation, Robotics, Virtual Reality, Thermal Management, Electronics, Computer science, Biosciences, Chemistry,….

- **Sports Sciences (PESS & LU)**

  Physiology, Biomechanics, Nutrition, Body & Product Motion Analysis…

- **OTHER NTU :**
  - **ACI** = Asian Consumer Insight
  - **School of Art, Design & Media**
  - **LKC School of Medicine**

- **Singapore rich R&D eco-system:**
  - SIM TECH = Manufacturing
  - **SSC/SSI = Sports Athletes**
  - A-Star : I2R = sensors, data systems
  - **BRONX = Footwear Design Centre**

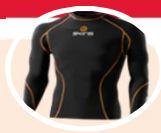
HARD		SOFT	
			
Hardgoods	**Protective**	**Textile**	**Footwear**
Bikes, Golf, Boards, Racquets, Bats, Balls…	Helmets Body armors Braces…	Apparels Backpacks Accessories…	Running, Indoor, Sports specifics…

Interdisciplinary approach

8 Core strategic strengths

HARDGOODS: 

PROTECTIVE: 

TEXTILE: 

FOOTWEAR: 

MATERIALS : Polymers, Nano-Composites and Structural Composites. Synthesis, Engineering and Processing parts. For lightweight & smart solutions. *(MSE + MAE + NC^3)*

ADDITIVE MANUFACTURING and mass customization *(NAMC)*

COMPUTER SIMULATION : Fluid Dynamics Performance Design *(MAE),*

EMBEDDED ELECTRONICS for smart products *(EEE, CINTRA, I2R…)*

DISRUPTIVE PRODUCT DESIGN and prototyping

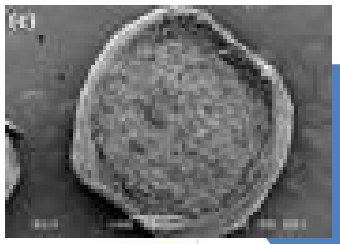
TEXTILE : Yarn functionalization, Smart tight fitting garment, Compression, Skin Interaction, Tropical climate and built-in thermoregulation

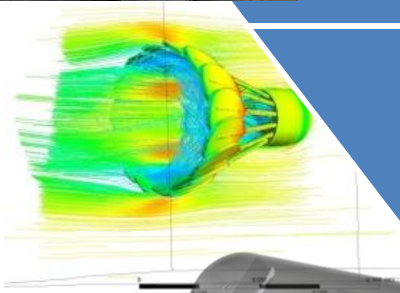
APPLIED PRODUCT TESTING solutions : *Product Perf. Lab + MAE Robotics+ PESS*

ASIAN POPULATION EXPERTISE : Consumer behavior, ethnography, biomechanics, physiology, perception, morphology

Consulting Offer & Deliverables

ISR is committed to deliver innovations at 4 levels :





Applied R&D

New tech demonstrator
Patent
Techno transfer

Product Design Engineering

Disruptive Product concept
Prototype
Patent

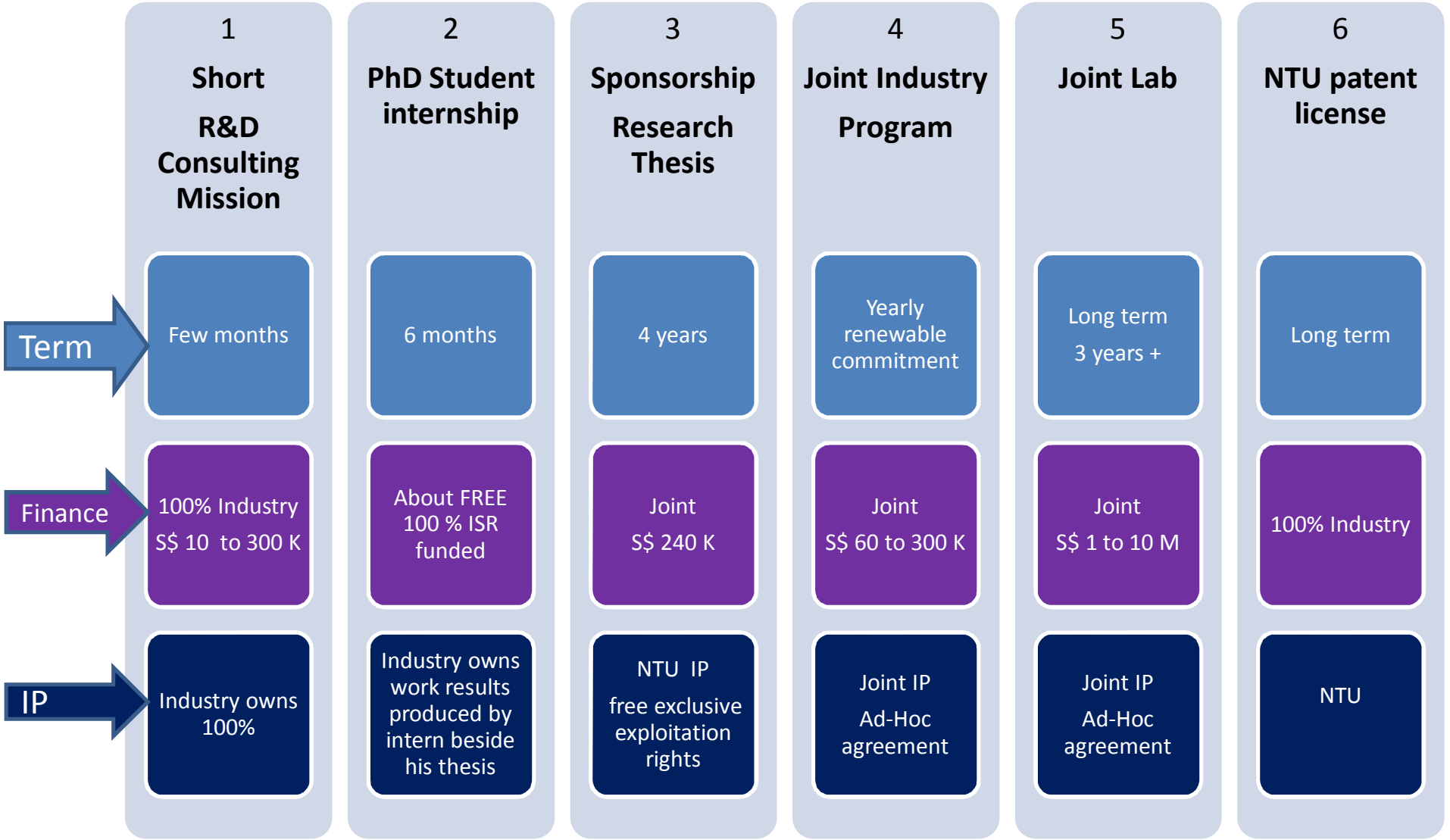
Product testing

New testing procedures
Product benchmark
Applied tests

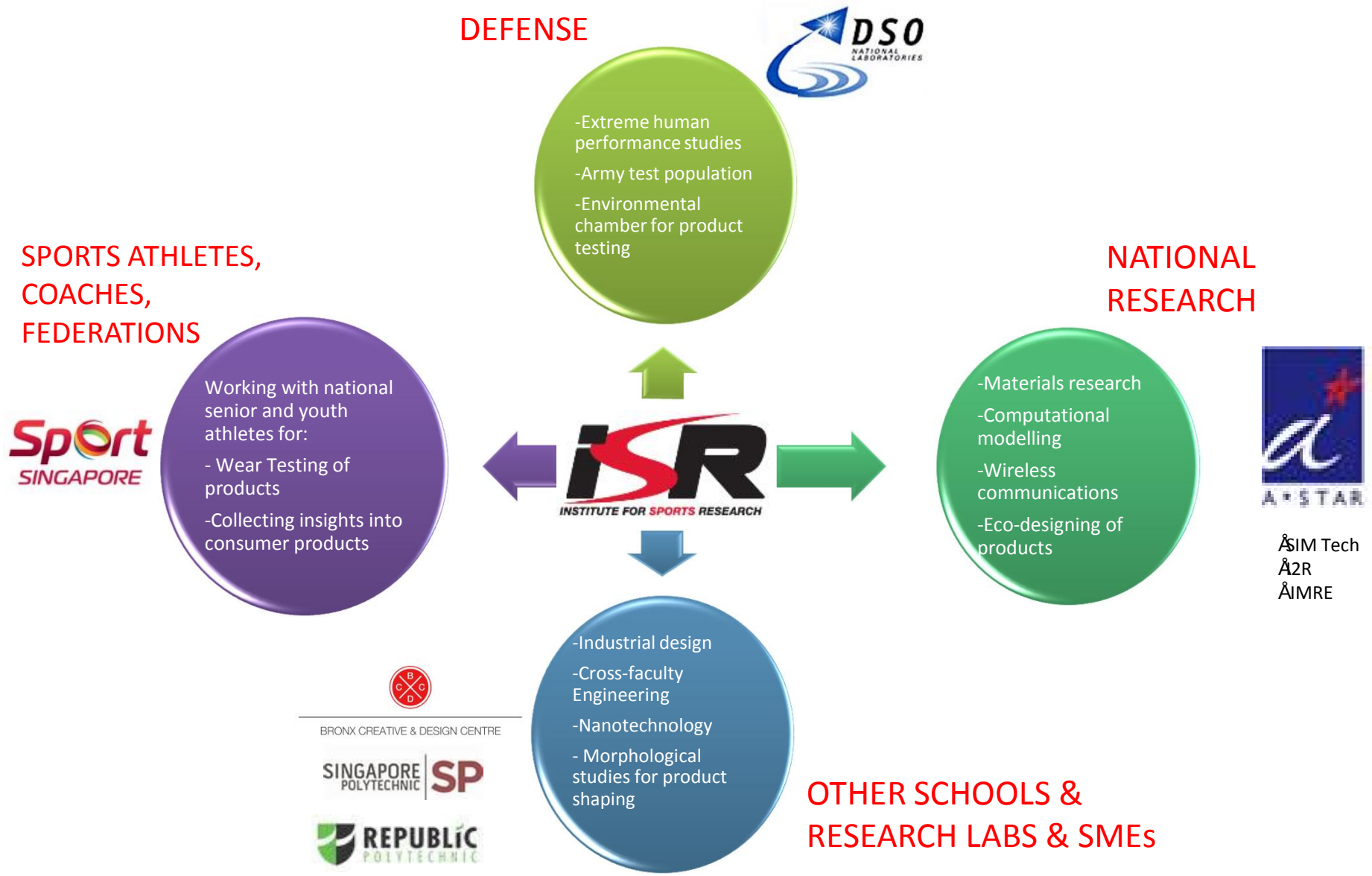
Manufacturing

Process solutions, Sustainability

Industry R&D engagement models



The Singapore Sports Research Interactive Platform



Unique World Class Additive Manufacturing Research Facilities

Vision : To be a regional leader of Asia Pacific in Additive Manufacturing Technology

Mission :

- To achieve technological innovations and breakthroughs through R&D
- To discover and innovate new industrial applications, transfer of knowledge and technology to local and regional industries
- To train and nurture a pool of talented manufacturing researchers/engineers to meet the increasing demands and to excite a new breed of engineers to the AM profession

Metals and Polymers :

- Selective Laser Melting (SLM), 1 big and 1 small
- Polyjet, 2 big and 1 small
- Fused Deposition Modeling (FDM)
- Selective Laser Sintering (SLS), 1 big and 1 small
- Electron Beam Melting (EBM)
- Bio Printer
- Stereo-lithography (SLA)
- 3D Printer

"I-Comp Sports" : Joint Industry Programme
Innovative Composites Solutions for Sports

	Golf shafts	Hockey sticks	Soccer and athletic shoes	Tennis & Bad. rackets	Table Tennis rackets	Bicycles frame and components	Windsurfing, Surfing, Sailing gear	Ski & Snowboards
Leading Innovative **Brands**	?	interested	?	confirmed	?	? Interested	interested	?
Materials Process Techno **Suppliers**	ARKEMA confirmed		CHOMARAT confirmed				HEXCEL ?	
Leading **Parts Manufacturer**	TOPKEY confirmed							

Bringing sports industry R&D in Singapore

Creating Innovative Products

Working with the ISR on contract research

Regular R&D joint research & capability exchanges

Basing a satellite R&D and Design team in the ISR

Setting up a full-fledged R&D and Design Centre in Singapore

- **Possible tax deductions for innovation activities and/or co-funding grants for R&D centre setup & manpower training.**

Subject to size and scope of operations in Singapore.

Some of our clients in 2014

INSTITUTE FOR SPORTS RESEARCH

An International Collaboration between

NANYANG TECHNOLOGICAL UNIVERSITY

Loughborough University

THANK YOU !

Contact :
Pascal Joubert des Ouches
pjdo@ntu.edu.sg