

How does ITRI do for Formation of Industrial-Academia-Government Collaboration

*A case of TAS
(Taiwan Aerospace Supply chain Alliance)
Formation*

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Industrial Technology Research Institute
2012. March

Outline

- ◆ **The Profile of ITRI**
- ◆ **Challenge and Chances of Global Aerospace Industry**
- ◆ **Solution Provided by ITRI**

The Profile of ITRI

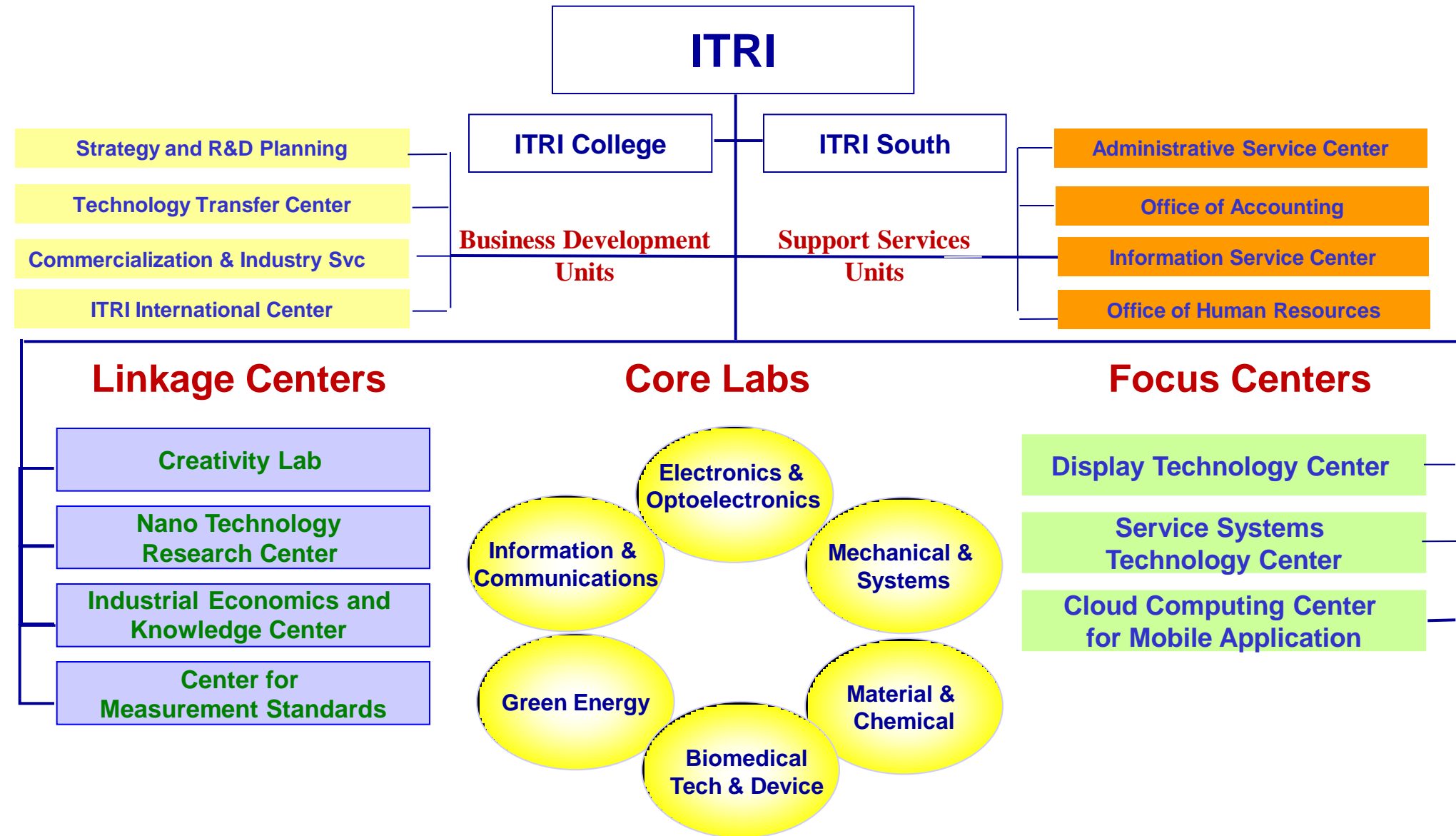
Industrial Technology Research Institute

A non-profit R&D institution founded in 1973

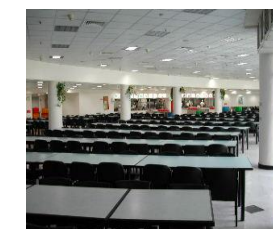
- To create economic value through technology R&D
- To spearhead the development of emerging high-tech industry
- To enhance the competitiveness of industries in the global market



Organization Structure of ITRI



Industrial Technology Research Institute



Total Staff : 5,813

Ph.D. : 1,296

Total Patents : 16,504

**Start-Ups : Spin-off 71
Incubated 170**

Scope of R&D

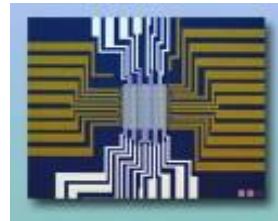


**Information and
Communications**

**Energy and
Environment**



**Electronics and
Optoelectronics**



**Biomedical
Technology**



**Nanotechnology,
Material and
Chemical**



**Advanced
Manufacturing and
Systems**



Plant Information Management

ITRI Open Lab

*A conducive environment for industries
to access ITRI R&D resources*

**Joint R&D Collaboration Programs
for existing companies**

Incubation of High-Tech Startups



170 new companies formed with total capitalization of US\$2.01 billion

ITRI Spin-Offs in Action



UMC: ITRI spin-off, 1979
1st 4" Wafer Fab in Taiwan
(US\$ 3,510M, 2004)



TMC: ITRI spin-off, 1988
1st Mask Fab in Taiwan
(US\$ 92M, 2004)

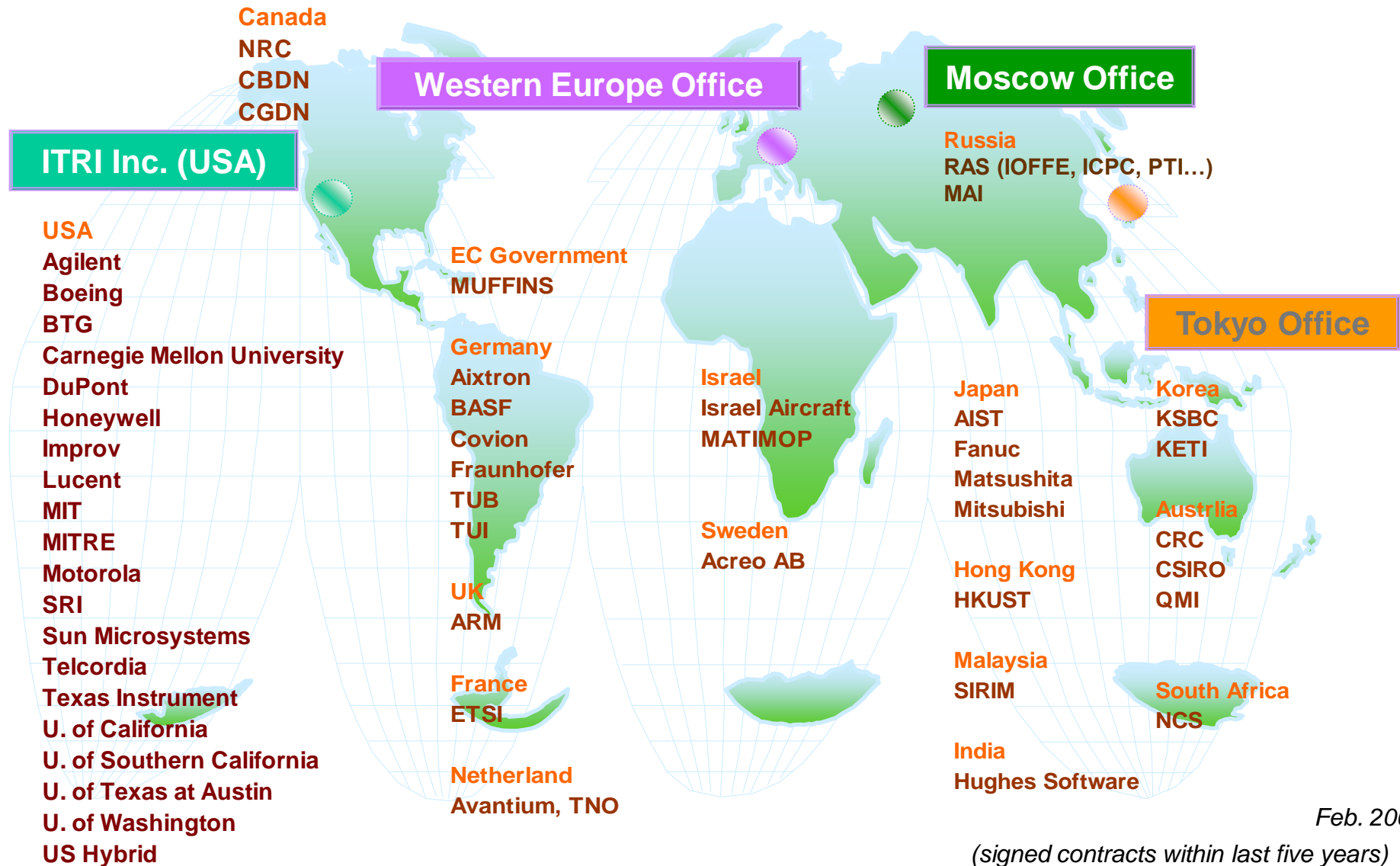


TSMC: ITRI spin-off, 1987
1st 6" Wafer Fab in Taiwan
(US\$ 7,659M, 2004)



VIS: ITRI spin-off, 1994
1st 8" Wafer Fab in Taiwan
(US\$ 475M, 2004)

ITRI's International Cooperation Network



Feb. 2005

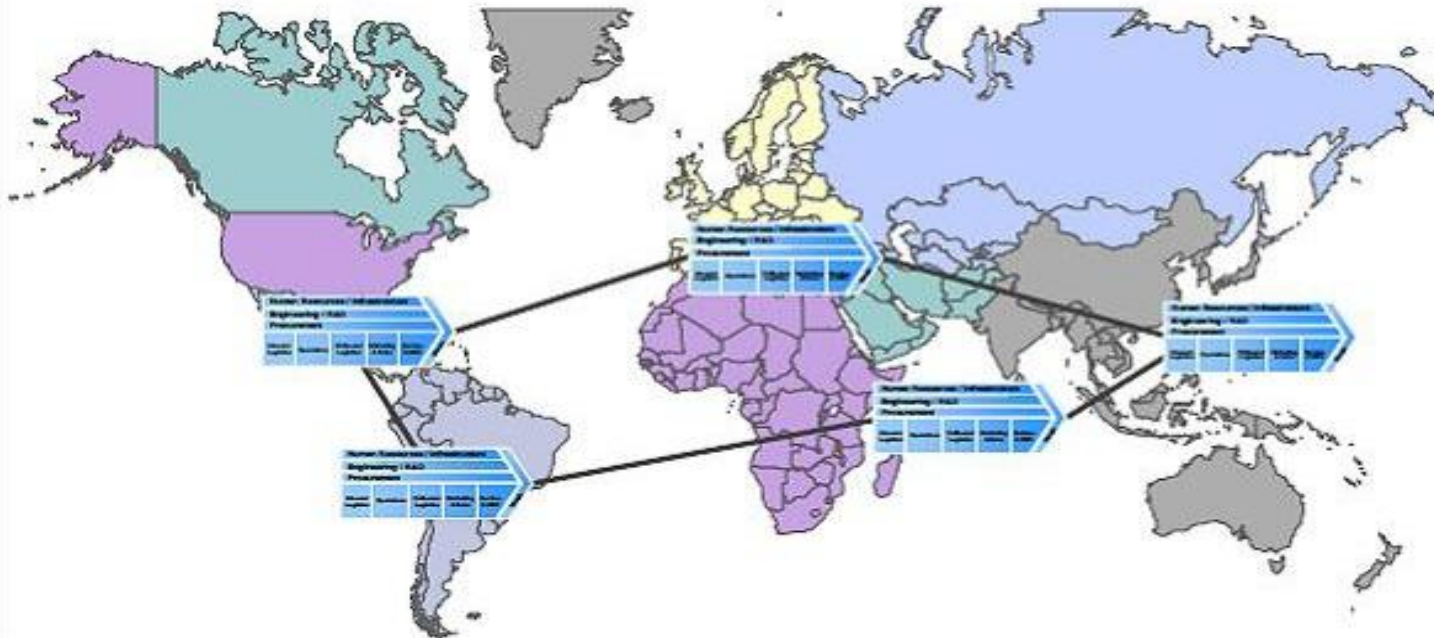
(signed contracts within last five years)

Challenge and Opportunity Of Global Aerospace Industry

*The Moves toward
the Next Global Stage*

The New Paradigm is to Manage Value Chain Processes across Dispersed Geographies

New Paradigm: Globally Dispersed Aerospace Value Chains



WHY?

- End of Cold War
- Falling communications & transport costs
- New digital online collaboration tools
- Lower trade barriers
- Emergence of global service firms
- Talent shortage in home markets
- Emerging economies become major customers

Globalization 1.0

- Foreign suppliers of materials, parts;
- “Multi-national cooperation” to achieve scale and critical mass (e.g. EADS/Airbus).



Globalization 2.0

- “Horizontal specialization” – OEMs and service suppliers tightly integrate functions across multiple locations on a global basis

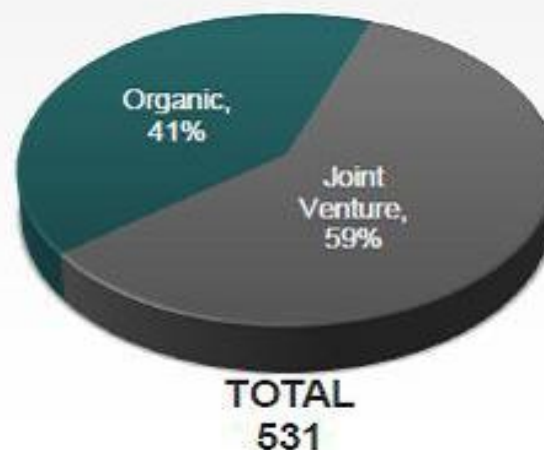
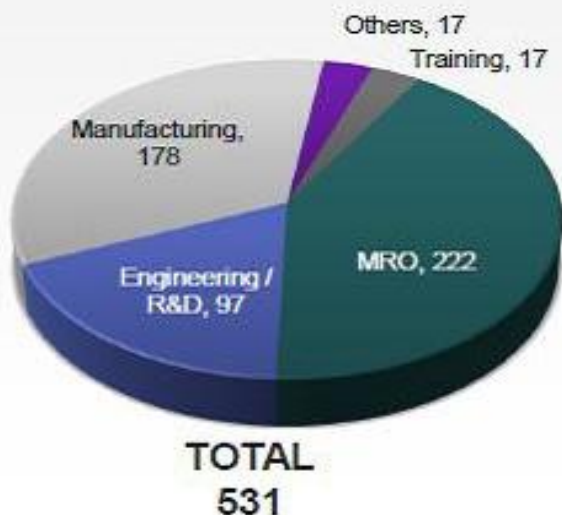
Source: AeroStrategy



Most Investments are Join Venture



Major Value Chain Investments By 121 Aerospace OEMs* 1990 – 2009**



- MRO investments were the most popular (42%), followed by manufacturing (34%) and engineering/R&D (18%)
- Joint ventures accounted for 59% of value chain investments; acquisitions are excluded from the analysis

* Includes joint ventures and organic investments for 120 largest OEMs; excludes acquisitions

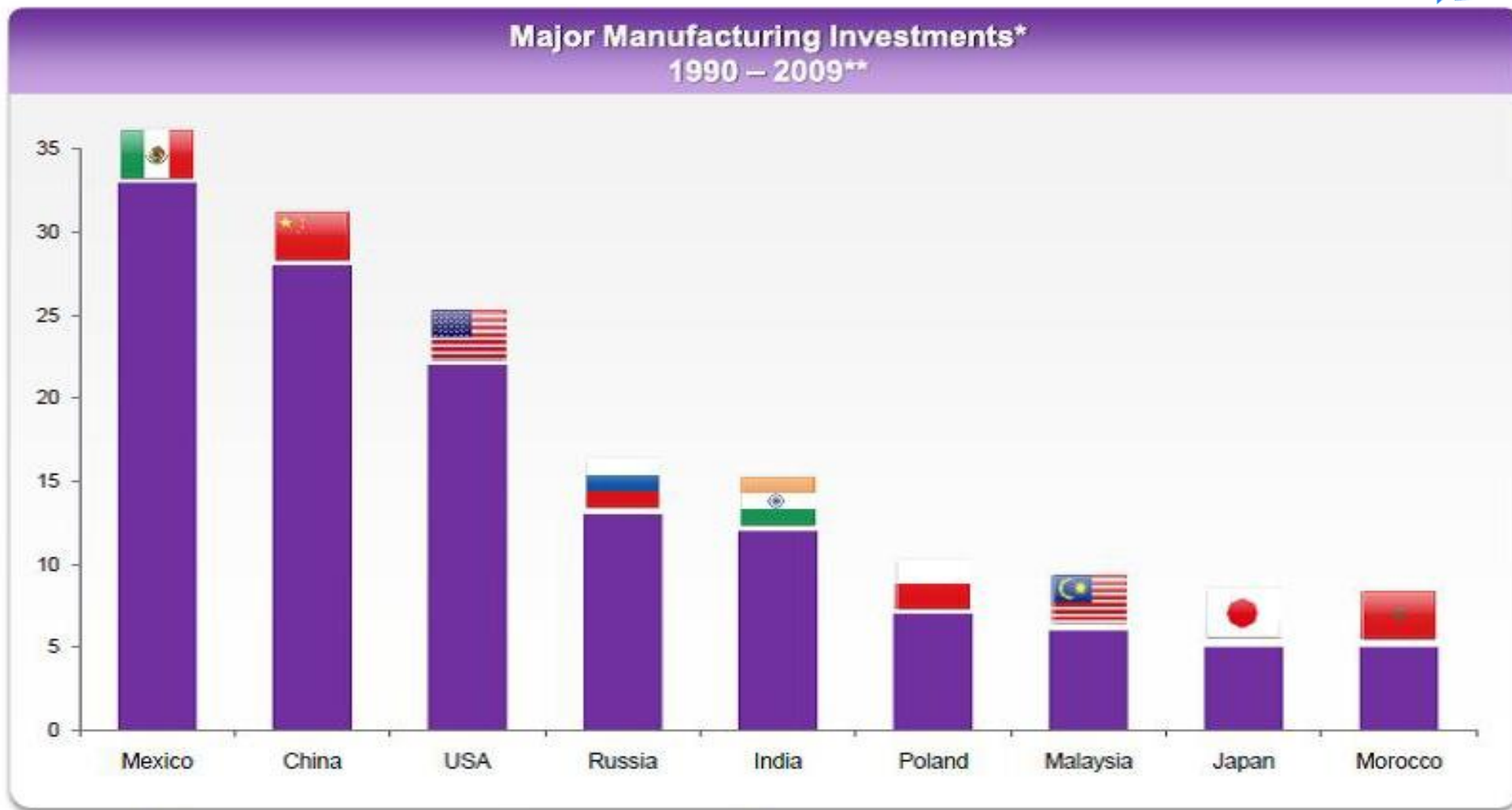
** 2009 data is as at 31 August 2009

Source: AeroStrategy

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The Role of Newly Emerging Nations



* Includes joint ventures and organic investments for 121 largest OEMs; excludes acquisitions

** 2009 data is as at 31 August 2009

Source: AeroStrategy



Mexico Had Created a Robust Aerospace Manufacturing Cluster over the Last Decade



Selected Aerospace Investment In Mexico



- Mexico has more than 186 aerospace firms with exports in excess of \$3 billion and total employment of more than 20,000 as of 2008
- 2008 investment of nearly \$1 billion
- Recent investments by Bombardier, Cessna, and Aernnova
- Aided by proximity to major US OEMs, NAFTA, and Bilateral Aviation Safety Agreement
- Government investing \$50 million in a National Public Aero Trade School

Source: MRO Management, MexicoNow

China also a very Popular Manufacturing Destination

Aerospace Investment In China



- Broad and deep manufacturing capability and comparative advantage in labor
- The second most popular destination for OEMs to establish JVs or new manufacturing facilities
- Also has a growing roster of second and third tier aerospace suppliers; some OEMs prefer “arms length” relationships with Chinese suppliers over direct investment
- Manufacturing and raw material capabilities will grow as the indigenous aircraft industry continues to develop



Source: AeroStrategy

The Changing Nature of Globalization has **TAS** Important implications of Suppliers



- Where to locate key activities to underpin strategy and desired competitive positioning?
- How to collaboratively manage value chain on global basis?
- Make vs. buy: which core competencies should be kept in house?
- How to leverage globalization to improve market access? To address human resource challenges?
- How to improve productivity without compromising IP protection?



- What is the proper balance of in-house versus outsourced activities?
- Where to locate key activities to underpin strategy and desired competitive positioning? How to leverage low cost poles?
- To what extent should investments follow those made by key customers?
- How to manage global supply chains and human resource pools?
- How to fend off threats from new competitors in low cost regions?




- Which aerospace market segments and/or value chain activities to target?
- How to develop elements of a “cluster ecosystem?”
- Desired mix of indigenous suppliers versus foreign direct investment?
- Appropriate regulatory and taxation policies?
- What is the required infrastructure? Human resources and education?
- For existing clusters: how to maintain competitiveness in light of emerging clusters in low cost regions?

Key Messages



- The nature of aerospace globalization is changing as OEMs experiment with new ways to manage and integrate their value chains across widely dispersed global geographies;
- The pace of globalization accelerated in recent years (2007/08/09);
- Several countries are emerging as new aerospace clusters including Malaysia, Mexico, Brazil, UAE, and Morocco;
- The changing nature of aerospace globalization creates opportunities and challenges for OEMs...and governments;
- Despite the increased pace of globalization, the aerospace industry is inherently political and is not "flat", but globalization will continue in the long term.

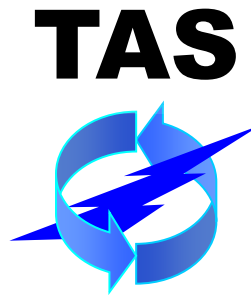


That's why we need to form a new alliance

Solution Provided by ITRI

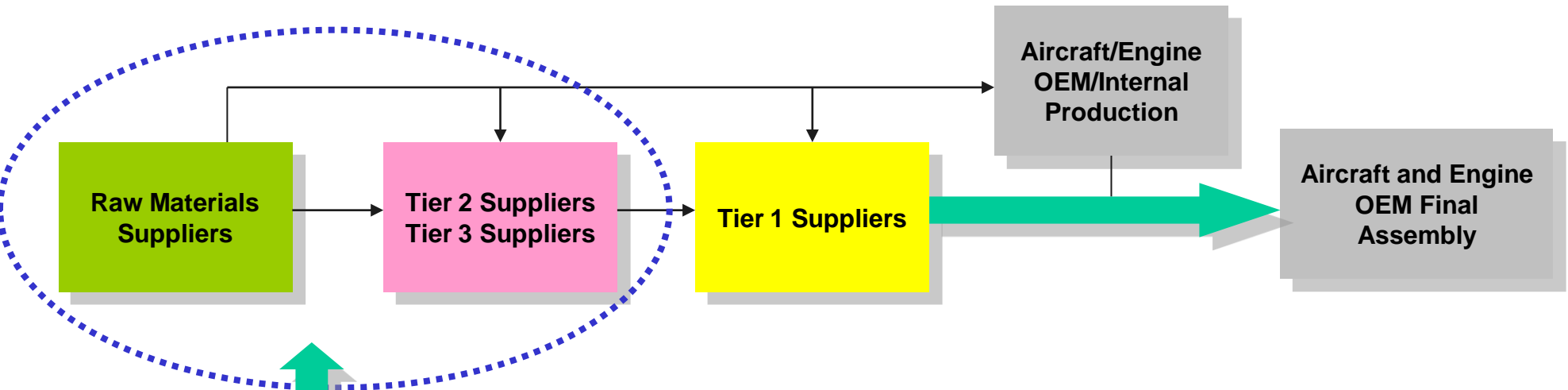
Supply Chain 2.0

The Vision of TAS



Solution to the changing of global supply chain

Strategy: One Stop Shopping

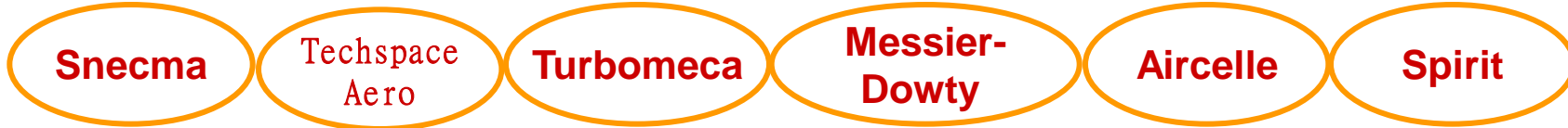


**Multi-functional
Co-champion
network**

- *Develop the collaboration platform for global business and strategic alliance*
- *Develop the key materials and technologies for aero industry*
- *Develop the platform and co-laboratory for key technologies*

Global orders

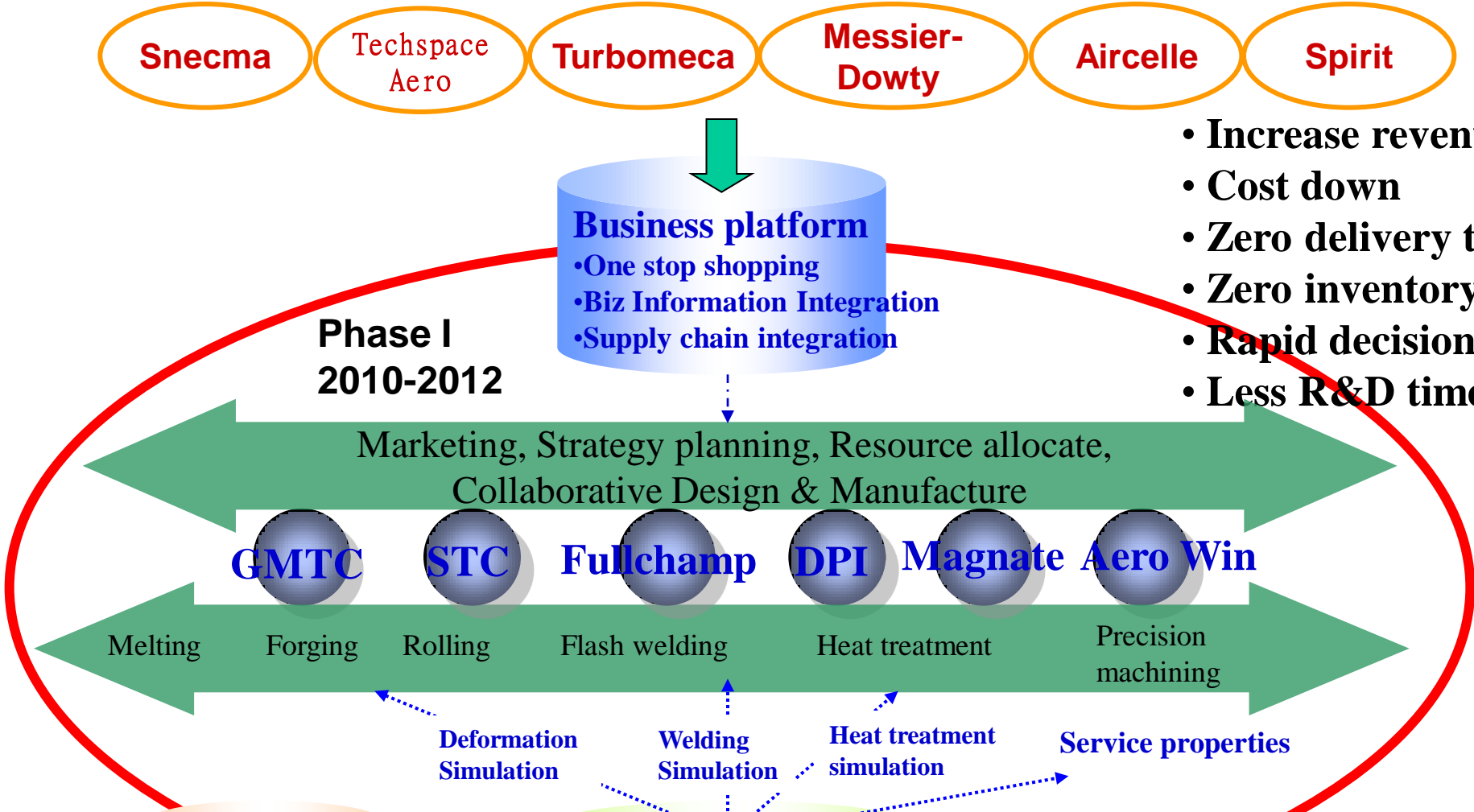
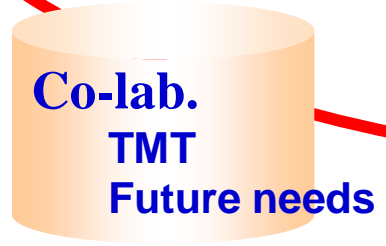
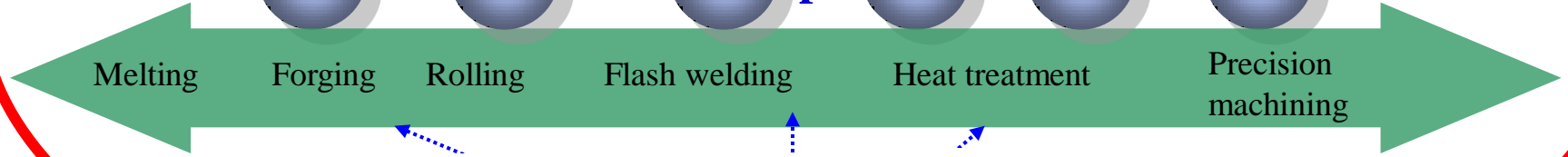
Airbus, Boeing



- Increase revenue
- Cost down
- Zero delivery time!
- Zero inventory!
- Rapid decision making
- Less R&D time

**Phase I
2010-2012**

Marketing, Strategy planning, Resource allocate,
Collaborative Design & Manufacture



High level processes

Raw Materials



Forming & Welding



Precision Machining & Special Processes



Modules

Engine/ Nacelle



Landing Gear



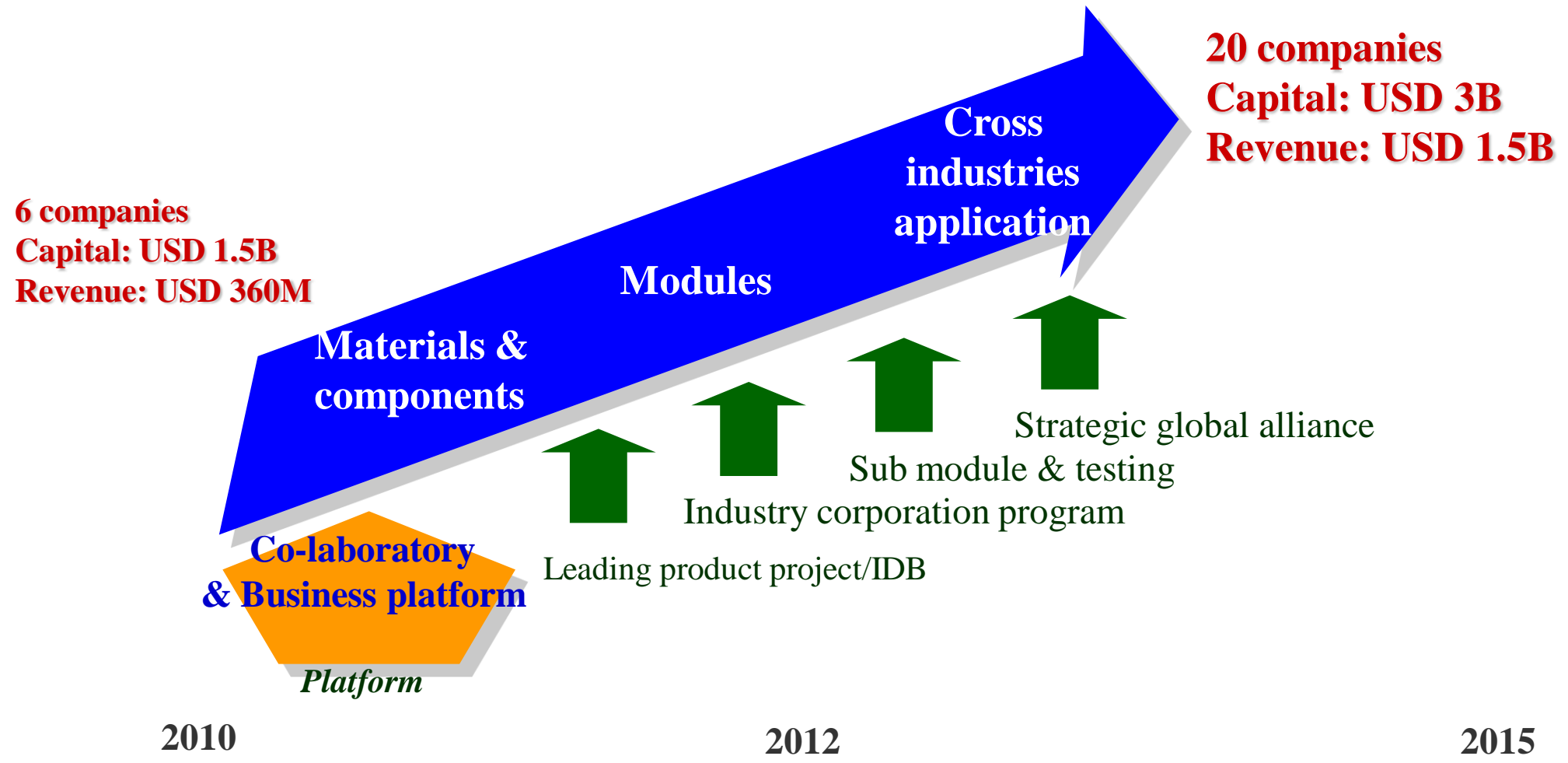
Actuator



Key System Integrators



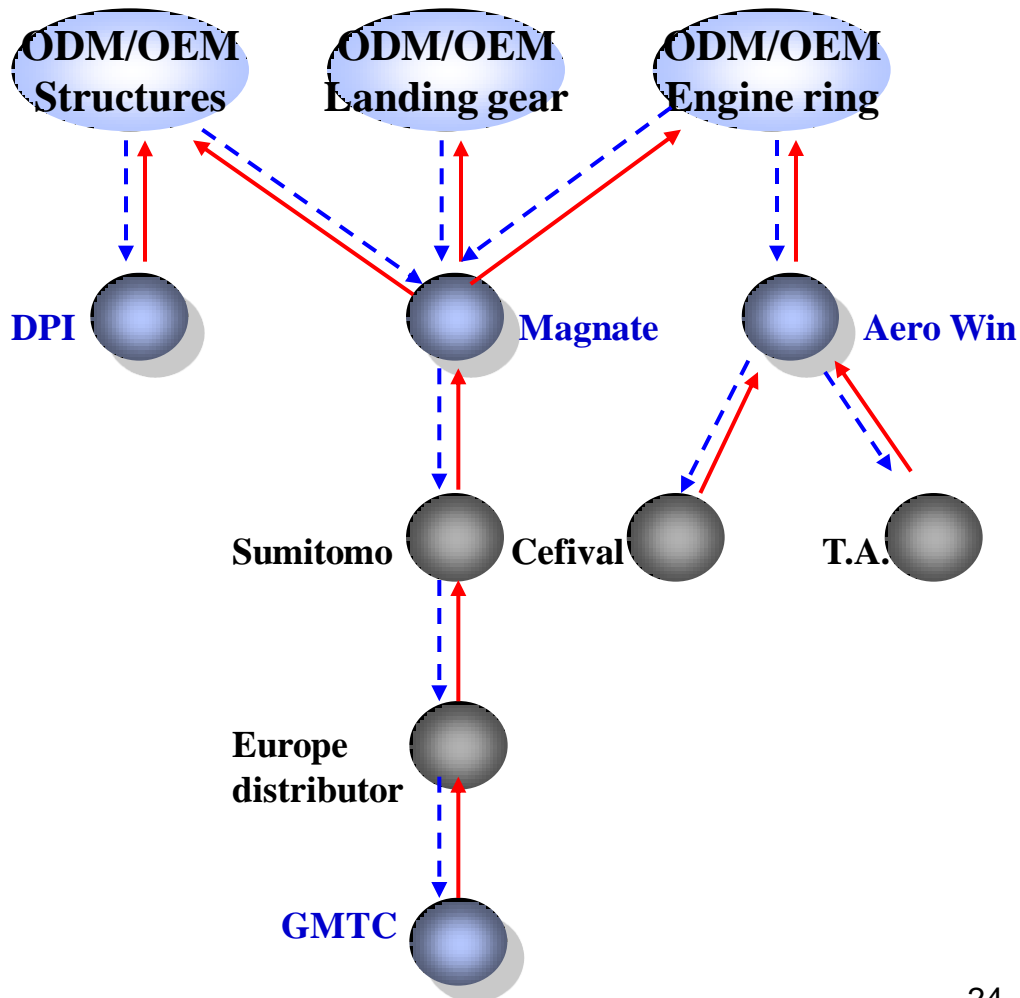
Roadmap



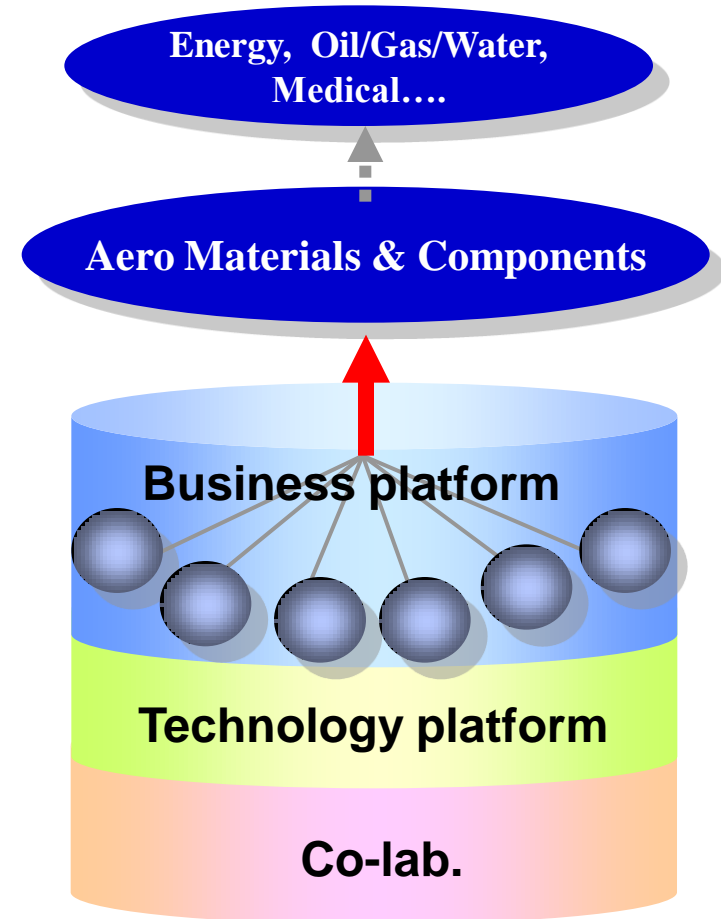
To be the main supplier of global aero/energy industry

New Business Model

As-is

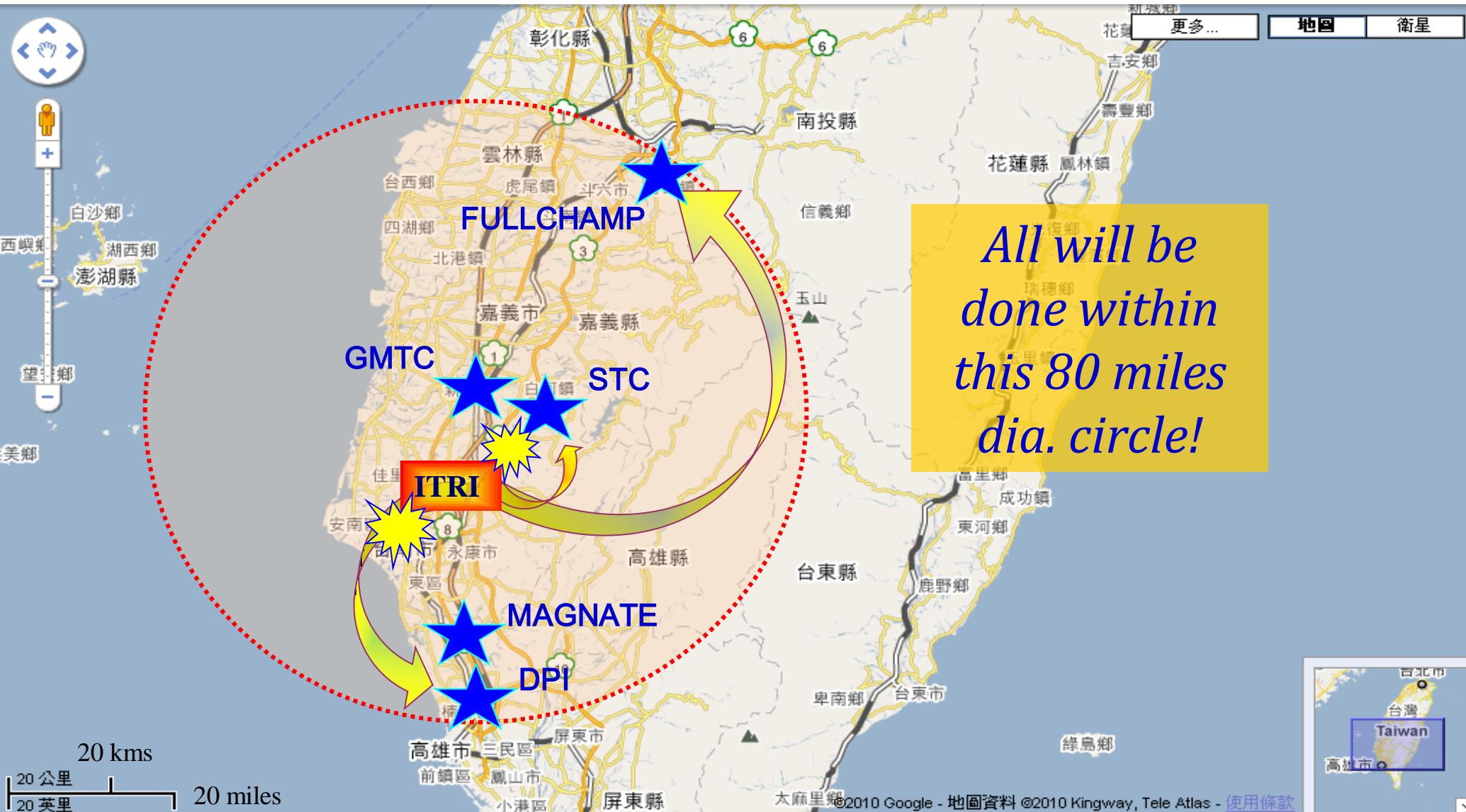


To-be



Multi-functional Co-champion Network

The Most closest Regional Network



Thank you for your Attention!

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