The 30th STAG Board Meeting

Topic 3: Strategies for Industry Foresight and Innovation

INTRODUCTION

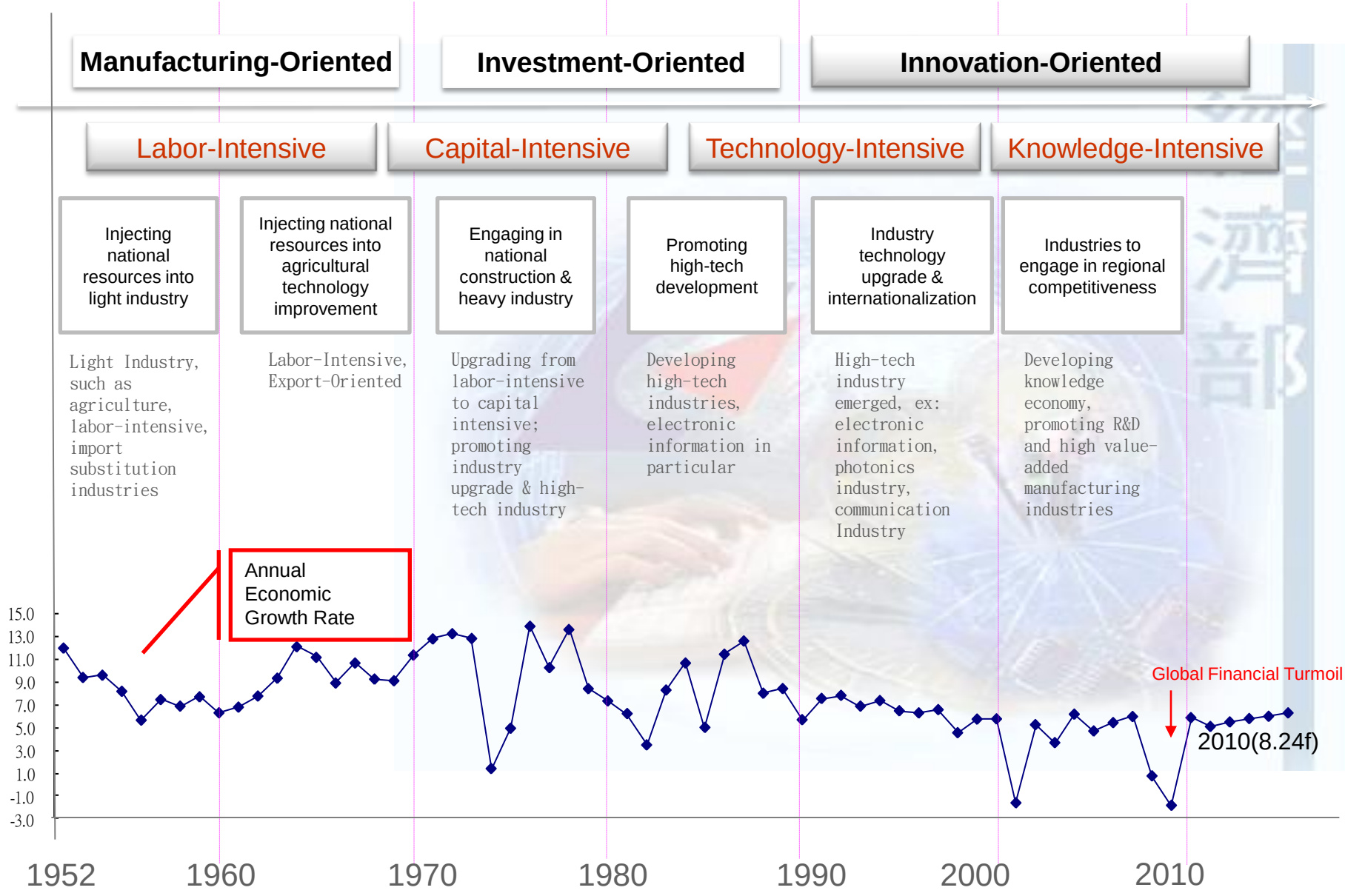
Presenter: Ming-Ji Wu
Director General, Department of Industrial Technology,
Ministry of Economic Affairs
December 1, 2010

Outline

1. Overview of Taiwan's Industry Development
2. Challenges of Taiwan's Industrial Innovation
3. Strategies and Action Plans
4. Conclusion

Overview of Taiwan's Industry Development

Taiwan's Industry Entering Innovation-Oriented Stage

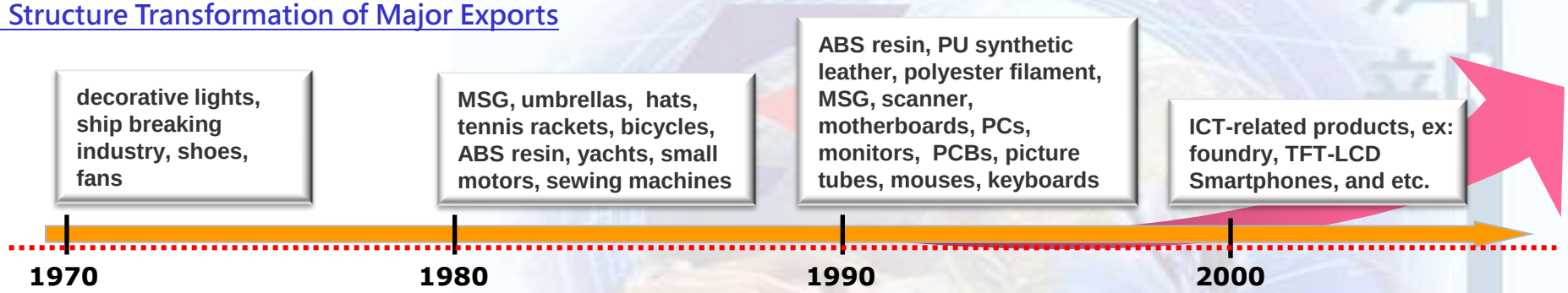


Source: "Advanced Research Program for Taiwan's Industrial Technologies" by DoIT, MOEA, compiled by MIC, October 2010

Technology Drives Economic Growth of Taiwan

Industry Structure Transformation

Structure Transformation of Major Exports



Factors Contributing to Economic Growth

Source: "Third-Term Plan for National Development in the New Century" by DGBAS, CEPD, compiled by MIC, October 2010

Taiwan's Global Competitiveness Underpinned by Technology

IMD/2010

Technology Infrastructure		Science Infrastructure	
1	USA	1	USA
2	Singapore	2	Japan
3	Hong Kong	3	Germany
4	Israel	4	Korea
5	Taiwan	5	Taiwan
8	Sweden	7	Sweden
15	Finland	9	Switzerland
18	Korea	10	China
22	China	12	Singapore
23	Japan	13	Finland

WEF/2010

Growth Competitiveness by Technology		Global Competitiveness by Innovation	
1	US	1	US
2	Finland	2	Switzerland
3	Taiwan	3	Finland
4	Sweden	4	Japan
5	Denmark	5	Sweden
6	Switzerland	6	Taiwan
7	Korea	7	Germany
8	Japan	8	Singapore
10	Singapore	11	Korea
64	China	26	China

Source: The World Competitiveness Yearbook 2010 (IMD); The Global Competitiveness Report 2009-2010 (WEF)

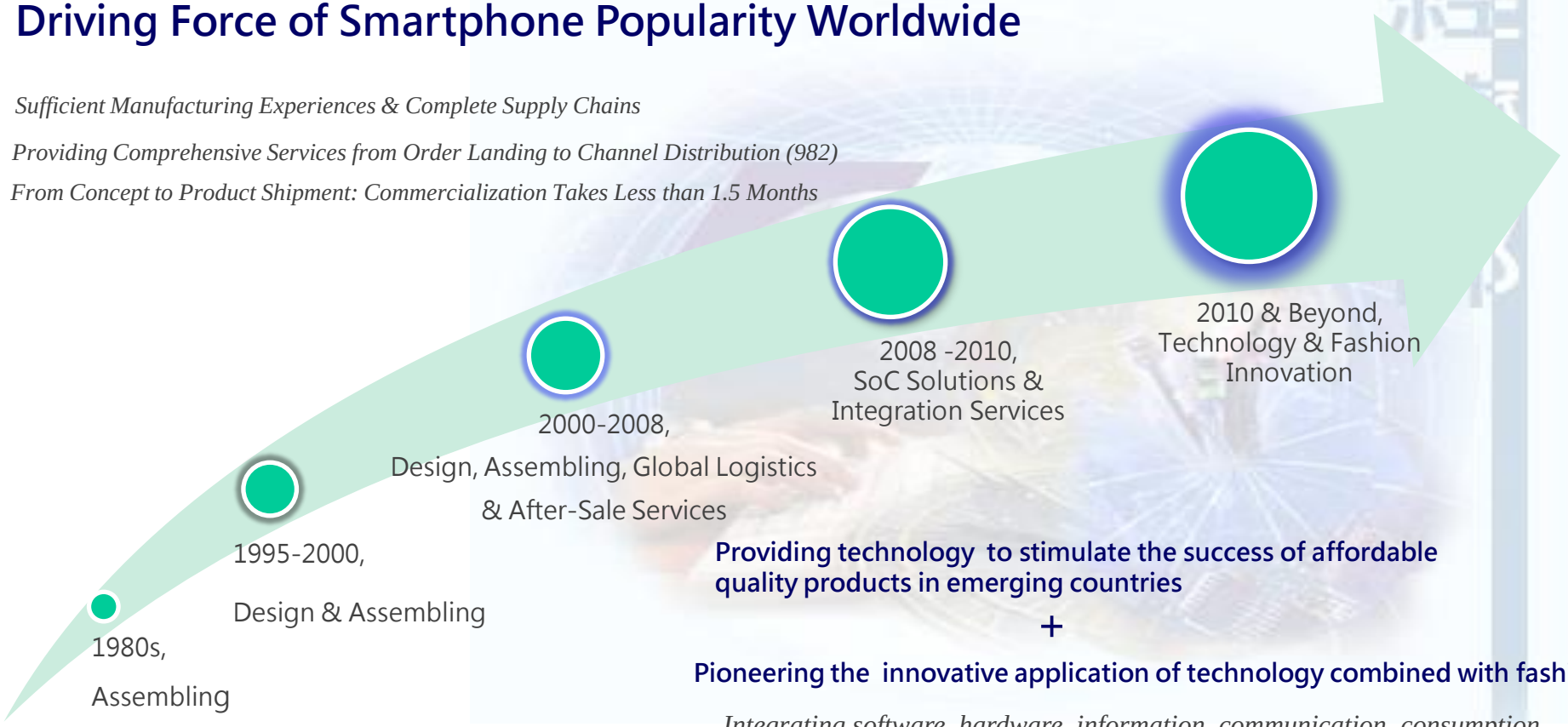
Roadmap of High-Tech Industry Development in Taiwan

Continuous Innovation from PC Industry
+
Driving Force of Smartphone Popularity Worldwide

Sufficient Manufacturing Experiences & Complete Supply Chains

Providing Comprehensive Services from Order Landing to Channel Distribution (982)

From Concept to Product Shipment: Commercialization Takes Less than 1.5 Months



Providing technology to stimulate the success of affordable quality products in emerging countries

+

Pioneering the innovative application of technology combined with fashion

Integrating software, hardware, information, communication, consumption

Providing high quality, easy access technical supports

Combining culture, marketing, and soft power with humanity, fashion, and new technology

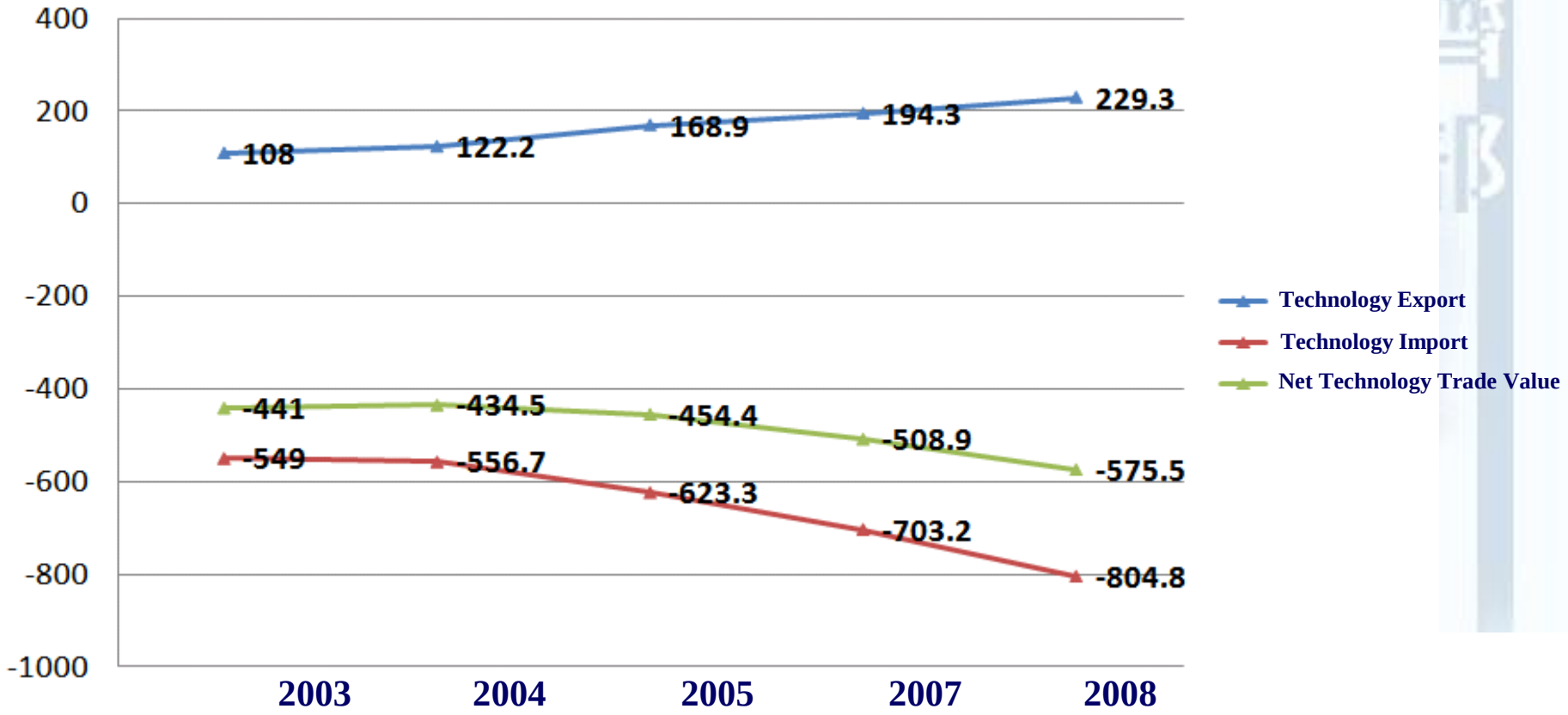
Challenges for Taiwan's Industrial Innovation

Issue I: Technology Import Exceeds Export

◈ **Insufficient control of core technologies and key components is reflected in the imbalance between Taiwan's technology export and import**

Taiwanese Technology Transaction Value Trends

Unit: NT$100 million

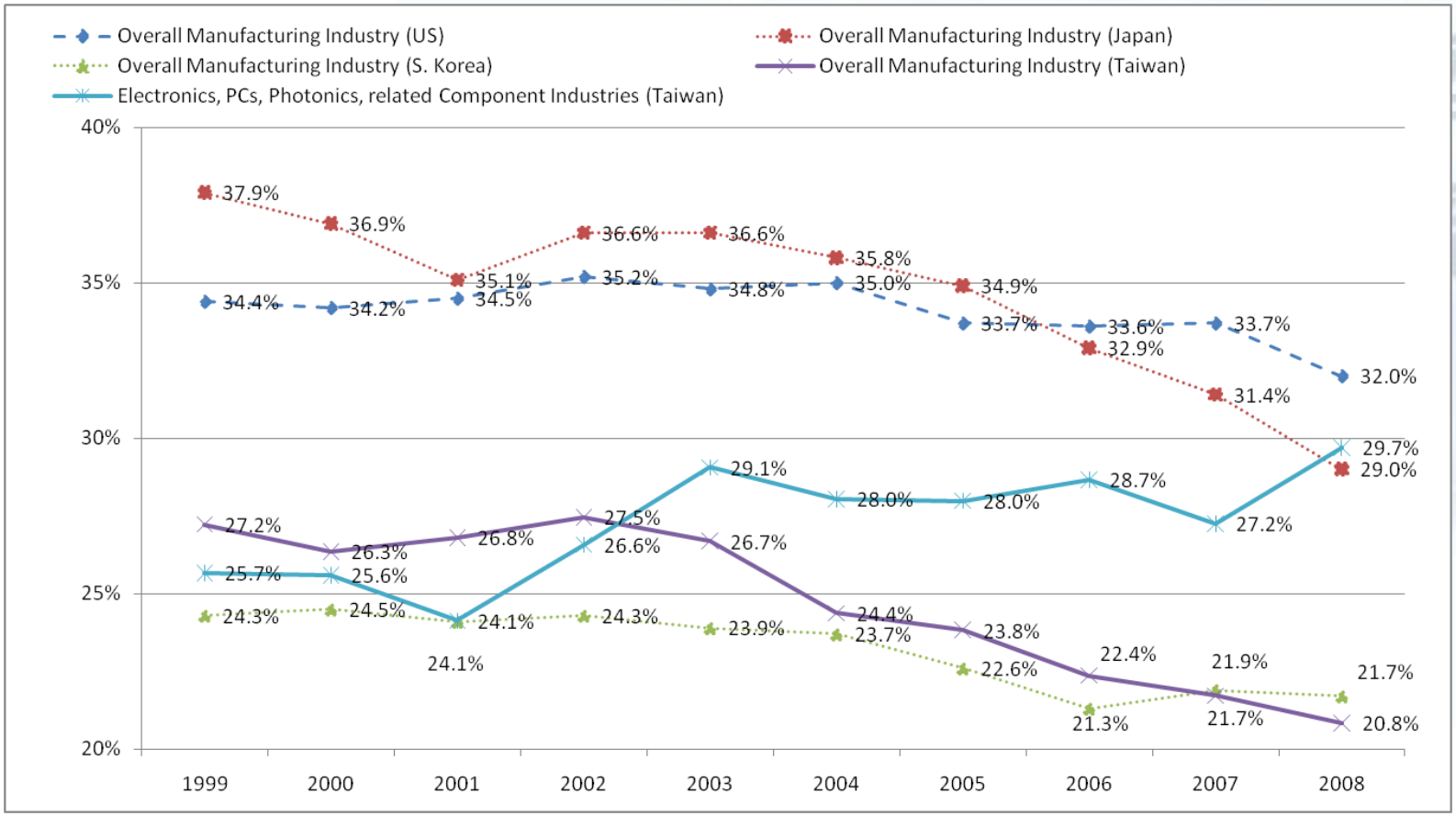


Source: *Industrial Statistical Survey Report*, Department of Statistics, MOEA, October 2010

Issue II: Low Profit Margins for Manufacturing Industry

- Over 70% of Taiwanese exports are intermediate goods, and over 70% of the intermediate goods can be put into production without being processed first; therefore, they are prone to be affected by the risks of material supply and simultaneously lack in direct contact with the customers.
- In 2008, added value of Taiwanese electronics, PC, photonics, and related component industries reached 29.7%, but overall manufacturing industry scored 20.8%, lagging behind US, Japan, and S. Korea.

Added Value Trends of Manufacturing Industries of Taiwan, S. Korea, Japan, US



Source: DGBAS, October 2010

Issue III: Insufficient Growth Momentum in Service Industry

Taiwan's service industry normally constitutes nearly 69% of the country's GDP; in the recent years, the growth momentum in the service industry slowed down, affecting the industry's contribution to Taiwan's economic growth

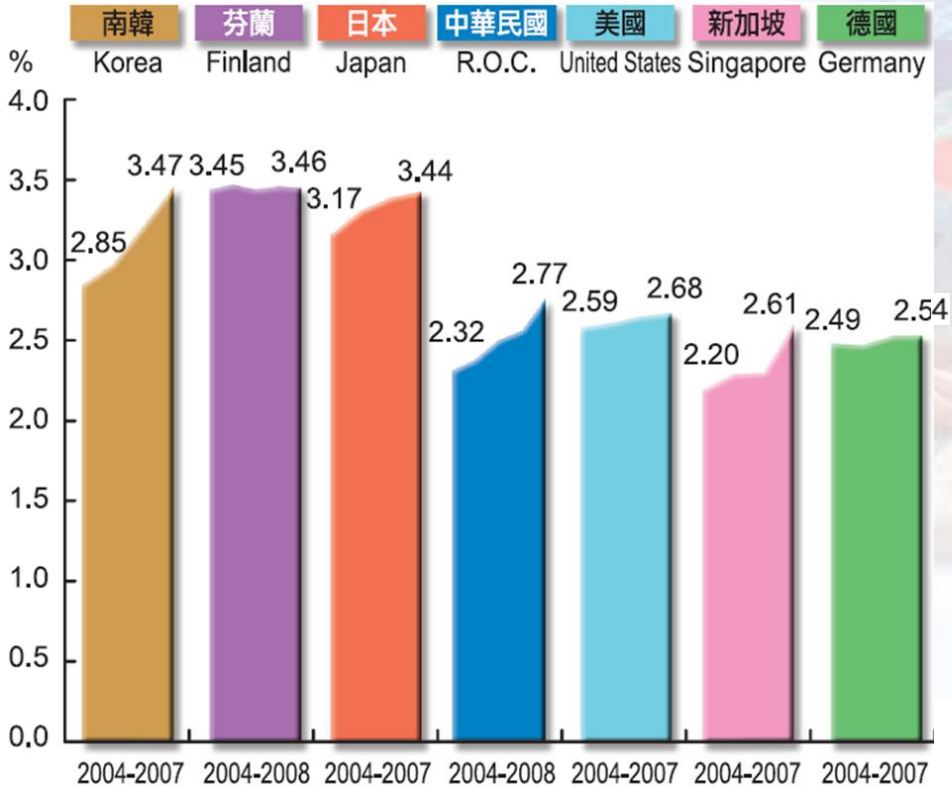
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Taiwan's GDP Share by Industry (Unit in %)													
Agriculture	2.46	2.38	2.45	2.02	1.9	1.82	1.71	1.68	1.67	1.61	1.49	1.6	1.55
Industry	32.22	31.66	30.55	30.52	28.74	30.38	31.2	31.75	31.26	31.33	31.38	29.25	29.79
Service	65.32	65.96	67	67.47	69.36	67.8	67.08	66.57	67.08	67.06	67.12	69.16	68.66
Manufacturing	24.68	24.44	23.92	24.63	23.23	25.02	26.13	26.81	26.53	26.46	26.52	24.98	24.67
Taiwan's GDP Performance by Industry (Unit in %)													
Overall	8.62	7.61	5.09	5.59	-2.16	4.36	3.39	5.98	3.47	4.23	4.96	-1.43	-0.57
Agriculture	-13.03	3.99	8.03	-13.22	-8.2	-0.08	-2.58	3.9	2.67	0.9	-3.02	5.39	-3.44
Industry	7.57	5.44	1.13	5.41	-8.14	10.43	6.16	7.86	1.86	4.34	5.08	-8.15	1.04
Service	10.28	8.88	6.98	6.4	0.86	1.86	2.26	5.12	4.29	4.26	5.1	1.69	-1.21
Manufacturing	8.12	6.27	2.59	8.66	-8.05	12.55	7.94	8.75	2.4	3.81	5.15	-7.16	-2.04
Contribution of Individual Industries to GDP (Unit in %)													
Agricultural	-4.81	1.34	3.89	-6.00	-7.90	-0.04	-1.42	1.15	1.33	0.36	-1.01	5.78	-9.88
Industrial	29.69	23.96	7.3	30.55	-118.64	70.78	56.93	42.29	17.56	33.07	33.03	-183.92	54.71
Service	75.13	74.7	88.81	75.44	26.54	29.26	44.49	56.56	81.11	66.57	67.99	78.14	-144.84
Manufacturing	24.26	21.14	12.89	38.33	-94.73	68.79	60.4	39.43	19.11	24.64	28.29	-136.37	91.70

Source: DGBAS, Executive Yuan , October 2010

Issue IV: High Innovative Capacity Yet to Boost Industry Added Value

◈ **Taiwan's R&D investment displays a high magnitude of growth and the country's innovation efficiency is remarkably high; however, Taiwan is yet to become one of the worlds' most innovative countries; is there a problem related to conversion efficiency or is the industry still lacking competitiveness in certain areas?**

R&D Spending Share of GDP by Country



EIU Innovation Index, 2009 - 2013

	Innovation Performance（Output）		Innovation Enablers（Input）		Innovation Efficiency
	Index	Rank (A)	Index	Rank (B)	=(B-A)
Japan	10.00	1	9.20	11	10
Switzerland	9.70	2	9.57	4	2
Finland	9.53	3	9.63	1	-2
Germany	9.49	4	9.56	5	1
United States	9.44	5	9.47	6	1
Taiwan	9.44	6	9.05	14	8
Sweden	9.42	7	9.60	3	-4
Israel	9.20	8	9.23	9	1
Netherlands	9.16	9	9.27	8	-1
Denmark	9.06	10	9.61	2	-8
Korea	9.05	11	8.81	17	6
Singapore	8.75	16	8.76	18	2
Hong Kong	8.46	22	8.19	22	0
China	5.98	46	6.30	41	-5

Note:1. Index is on a 1-10 scale

2. If innovation output ranking outperforms innovation input ranking, the wider the gap the better the innovation efficiency

Source: *Science and Technology Statistics Summary* by National Science Council; *White Paper on Taiwan Industrial Technology* by DoIT, MOEA, October 2010

Strategies and Action Plans

National Policies Envisioned by President Ma Ying-Jeou

- Modify industrial structure; adjust economic policies
- Innovation not exclusive to high-tech industries
- Identify priorities among all key industrial production technologies so as to implement cultivation plans, strength R&D and in-house production capabilities for these prioritized technologies, whereby boost Taiwan's innovation competitiveness

Progress from Industry Upgrade to Industrial Innovation

- **The definition of innovation has been readjusted and a lot more industries will be significantly benefited as a result**
  - The definition of innovation will be in line with OECD (Organization for Economic Cooperation and Development) principles for enterprise innovation; other than improving product development and manufacturing processes, new concepts for service, marketing and business management will also incorporate into the definition of innovation
  - Small-, medium-, or large-sized enterprises in either high tech or traditional industries will be equally benefited in the future
- **Dual Development Models Focusing on Both Manufacturing and Service Industries**
  - Taiwan's government will actively participate in wholly upgrading the traditional industries, including the introduction of R&D capabilities, consolidation of ICT technologies , the promotion of competitiveness for traditional industries so as to help these industries move towards higher added value
- **Promote the Servitization of Manufacturing and Technicalization of Service**
  - Desert the outdated thinking of boosting shipment value by increasing shipment volume; deliver product/service bundles to boost added value while improve profits with product optimization and the addition of patents
- **Modify Industry Development Assessment Index; Shift Focus Away from Industry Value Alone**
  - Focus on balanced development in economic growth, environment preservation, and society justice
  - Pay attention to individual industries' ability to react to challenges in regards to weather changes, carbon reduction and energy reservation, as well as green production

ECFA Opens a New Chapter for Industry Innovation

- **New Visions and Strategies for Global Investment Recruitment**
  - Through the signature of the ECFA (Economic Cooperation Framework Agreement), Taiwan is capable of attracting Taiwanese enterprises to make high added value investment (R&D and innovation centers) in Taiwan by leveraging on the Three Links between China and Taiwan, whereby provide more amiable trading environment
  - Leveraging Taiwan's competitiveness to enter the Chinese and Southeast Asian markets; taking the advantage of the business tax reduction, overseas enterprises in Europe, US, and Japan are more willingly to collaborate with Taiwanese enterprises to tap business opportunities brought by the ECFA
  - Meanwhile, exploit other export opportunities while develop emerging markets so as to avoid market concentration risks
- **Enhance Soft Power and Assist Enterprises in Developing Brands and Distribution Channels to Complete Upgrade and Transformation**
  - Plan mid- and long-term development goals; provide explicit development routes for all industries to thrive while avoiding risks; create new paths for the new decade
  - Lead industries to embrace new business strategies; avoid falling into the vicious low-price competition; develop unique business models
  - Use traditional industrial resources effectively; promote cross-industry collaboration; boost innovation capacity; foster innovative industries

Ongoing Optimization for Industry Innovation

Technology Input Exceeds Output

Low Margin Rates for Manufacturing Industry

Insufficient Growth Momentum in Taiwanese service Industry

High Innovation Capacity vs. Low added value

Valley of Death
(the transition from invention and innovation to industry application)

Darwinian Sea
(Challenges for products to progress from trial production to large-scale industrialization)

Living Context Analysis → Industrial Technology Forecasts → Technology Development → Application Research → Prototype Design → System Integration → Business Model Design → Mass Production → Brand Marketing → Customer Service

Provision of innovative perspectives to study and tap future demand so as to help industry cross the valley of death

Provision of the field environment, service model and public infrastructure investment to help industry survive the Darwinian Sea

2020 台灣產業新願景 Envision 2020 民想・明享

2025 未來力實驗室 Future Lab • Vision 2025

智慧生活科技運用計畫 Smart Living Technology & Service Program

服科中心 Technology Center for Service Industry

創意中心 Creativity Laboratory

Technology Development Program
by DoIT of MOEA

- Academic TDP
- Organization TDP
- Industrial TDP

Source: DoIT, MOEA, compiled by MIC, October 2010

Conclusion

Metamorphosis and Ascension

- Adjustment of the industrial structure involves complex macro environment and competition, and there will be no perfect example to follow in the future
- Technological shift no longer the axis from gradual improvement to innovative breakthrough; key issues in the future consist of creativity, culture, design, and human concern
- The overall strategic thinking should be based on past experiences and future outlook, preparing for the risks ahead with a cautious attitude

■Practical strategies from gradual improvement to breakthrough innovation

–Constant Renewal

✓Advanced industrial technology research

✓System innovation of the service industry

–Continuous Improvement

✓Fundamental industrial technology cultivation

Employing past experiences to drive economic and industrial breakthroughs

Topic III: Plans for "Strategies for Industry Foresight and Innovation" focus on development and integration of advanced industrial technologies, fundamental industrial technologies, and service system innovation

Subtopic I: Review of and Outlook for Mid- and Long-term Advanced Industrial Technology Research

- **Advanced R&D should not be an extension of existing technologies but a means to create new products or industries in five or ten years**
- **Technology industrialization should focus on creating new industries and reinforcing the industry value chain; advanced R&D results should be incorporated seamlessly into the industry in the future**

Issue I	How can the proprietary academic R&D assets from domestic and overseas be connected for "Discovery Based Research", and how can research results be applied to industrial technology?
Issue II	How can government, industry, academia, and research institute be encouraged to work together to build system and service trial platforms to speed up the application of innovative and advanced research?

Subtopic II: Strategies for Enhancing Innovation System in Service Industry

- **There should be a clearly defined service system rather than mere aggregation of technology applications**
- **The TDPs should adopt a more prompt and comprehensive mechanism catering to the establishment of the service system and key innovations, so as to accelerate innovative service development of the industry, thereby contributing to the transformation and elevation of the industry**

Issue I	How to expand and make SEE (Service Experience Engineering) an innovation engine for the service industry and develop an application system similar to GE's Six Sigma training, so as to accelerate the system innovation of the service industry?
Issue II	How to leverage on the TDPs to invest in future-oriented service innovations and realize the innovative service system scenario through field trials, so as to make people experience the services and establish the value chain of new service industries?
Issue III	In addition to ensuring the ratio of TDP funding and tax reductions for service R&D, how to leverage on the government-led service innovation system to push the involvement of enterprises in service R&D?

Subtopic III: Strategies for Developing Fundamental Industrial Technology

- **The lack of fundamental scientific technologies and key IPRs has led to difficulty in elevating the added value of Taiwan's industry**
- **Key technologies required by industrial production should be cultivated and deployed since fundamental industrial technologies are crucial to the development of the golden decade**

Issue I	How to build a mechanism, supported by stable long-term funding, to promote joint investments in fundamental technology development by the government, academia, and industry?
Issue II	What are the roles played by various government agencies in talent cultivation, academic research, and industrial development?
Issue III	How to construct a platform to integrate R&D resources to invest in fundamental industrial technology development?

Appendix

Overview of the 7th National Industrial Development Conference

Vision	**Cultivate soft power and optimize the structure of the industry**
Objective	•28% added value for Taiwan's overall manufacturing industry in 2020 (21% in 2008) •15% intangible assets in the fixed capital of Taiwan's industry in 2020 (7% in 2008) •30% value accounted for by new industries such as green energy in overall manufacturing industry in 2020 (4% in 2008)

Common Topics: Structural Adjustments and Strategies for Taiwan's Industry in 2020

Resolutions

• Enhance soft power to create advantages of the industry • Create new export models to boost trade in services • Energy conservation for a sustainable society • Promote investments to expand enterprise operations and job opportunities • Participate in global economic integration to enrich Taiwan's global networks and business opportunities • Become a base for experience economy and develop both manufacturing and service industries

Panel Topics

Enhance global competitiveness in face of regional integration	Promote green development of the industrial sector	Improve industrial competitiveness and enhance added value of products	Adjust structure of human resources while boosting employment

Source: The 7th National Industrial Development Conference, August 19-20, 2010

Resolutions of Major Industrial Structure and Innovative Strategy Conferences

The 7th National Industrial Development Conference, Aug.19-20, 2010

- **Taiwan Industry Development Outlook, 2020**
  - Economic Growth: Sustainable growth to consolidate Taiwan's economic status
  - Adequate Employment: Adjust industrial and human resources structure to create job opportunities
  - Sustainable Environment: Adopt the green growth model and fulfill Taiwan's international responsibility
  - Quality Living: Pursue industrial development to enhance the quality of living
- **Advice for Industry Development Policies**
  - Enhance soft power to create advantages of the industry
  - Create new export models to boost trade in services
  - Energy conservation for a sustainable society
  - Promote investments to expand enterprise operations and job opportunities
  - Participate in global economic integration to enrich Taiwan's global networks and business opportunities
  - Become a base for experience economy and develop both manufacturing and service industries

Service Industry Development Outlook and Blueprint in 2020, Sep. 16-17, 2010

- **Service Industry Development Outlook in 2020**
  - A major force in LOHAS innovation and creative living
  - A model society of quality living in the Chinese-speaking regions
- **Service Industry Development Blueprint in 2020**
  - Global business expansion with operation based in Taiwan
  - Forming creative communities to create localized consumption of high quality
  - Developing knowledge value-added applications and new types of service industries
  - Knowledge integrated through the system to provide professional services
  - Corporate or enterprise management of public services

Thank you for listening