

Achieving Critical Mass

A Presentation By

Denzil J. Doyle
Chairman, Doyletech Corp.

November 2003

Ottawa Technology Cluster (OTC) Statistics

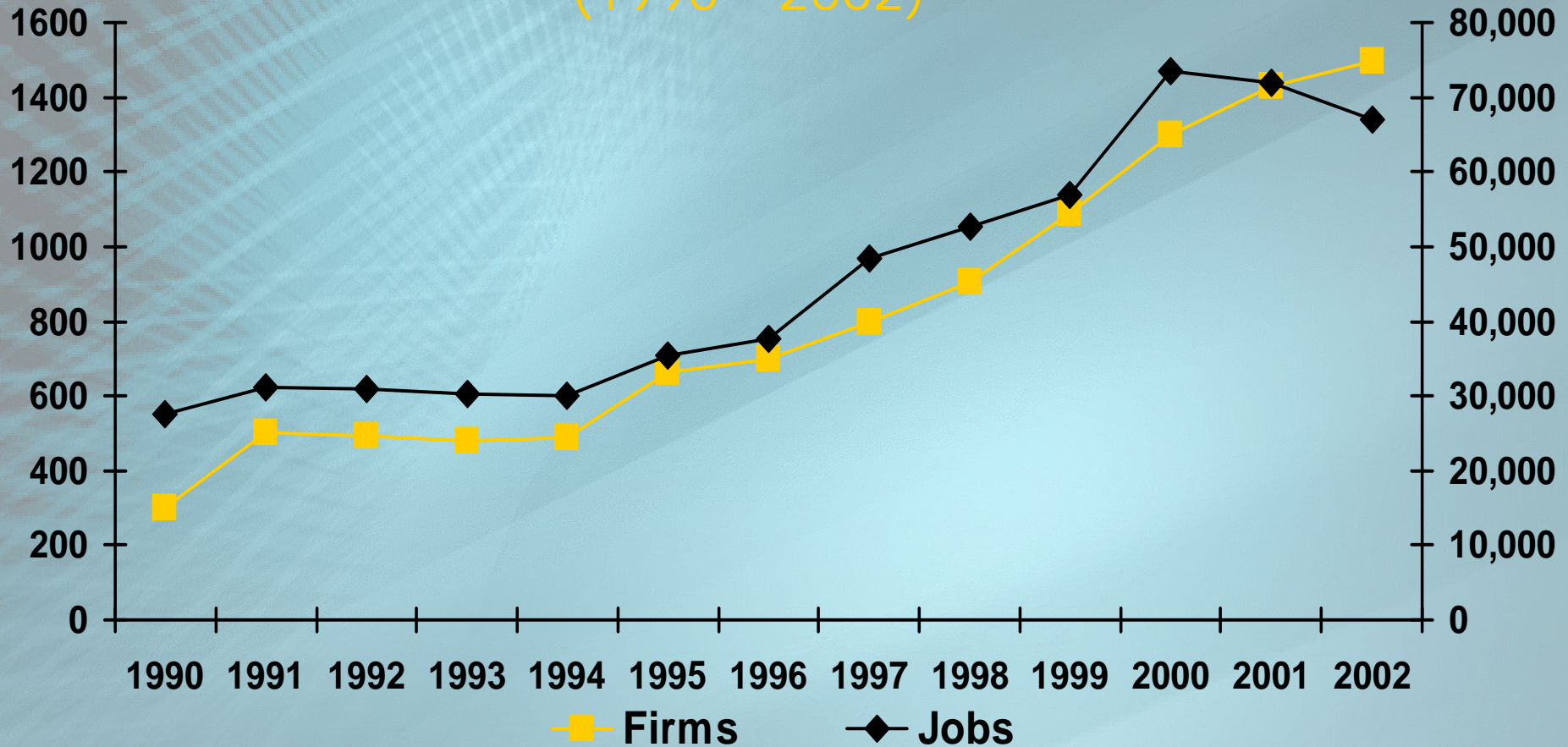
- *Current employment* – 60,000 (down from 75,000 in 2000)
- *No. of companies* – 1,675 in June 2003 (up from 1,300 in 2000)
- *Total sales* - \$10 billion (down from \$13 billion in 2000)
- *Local direct payroll* - \$3.6 billion

Turbulence is Nothing New

- Microsystems closure in 1974 dropped OTC employment by 20%
- But it spawned at least 30 new companies (e.g. Mitel, Mosaid, Calian)
- Many black Fridays (e.g. Computing Devices, Leigh Instruments, Gandalf, Compaq)
- JDS Uniphase impacted Vancouver Island

OTC Historical Trends

Number of Firms and Total Employment
(1990 - 2002)



The Driving Forces Behind Clusters

- Research / Academic – Waterloo, Research Triangle Park, Ottawa
- Manufacturing – Ireland, Scotland, Mexico
- Local Entrepreneurship – Boston, San Jose, Ottawa, Vancouver
- Large Government Hi-Tech Presence – Houston, Huntsville

Some Canadian Clusters

- *Montréal*: IT, Biotech, Multimedia, Aerospace
- *Ottawa*: IT, Telecom, Photonics. Microelectronics
- *Toronto*: IT, Biotech, Multimedia/Film, Finance
- *Kitchener-Waterloo*: IT
- *Saskatoon*: Biotech
- *Calgary*: IT, Telecom, Wireless
- *Vancouver*: IT, Film, Wireless, Energy
- *Vancouver Island*: IT, Advanced Mfg., Ocean & Environmental

Cluster / ED Strategies

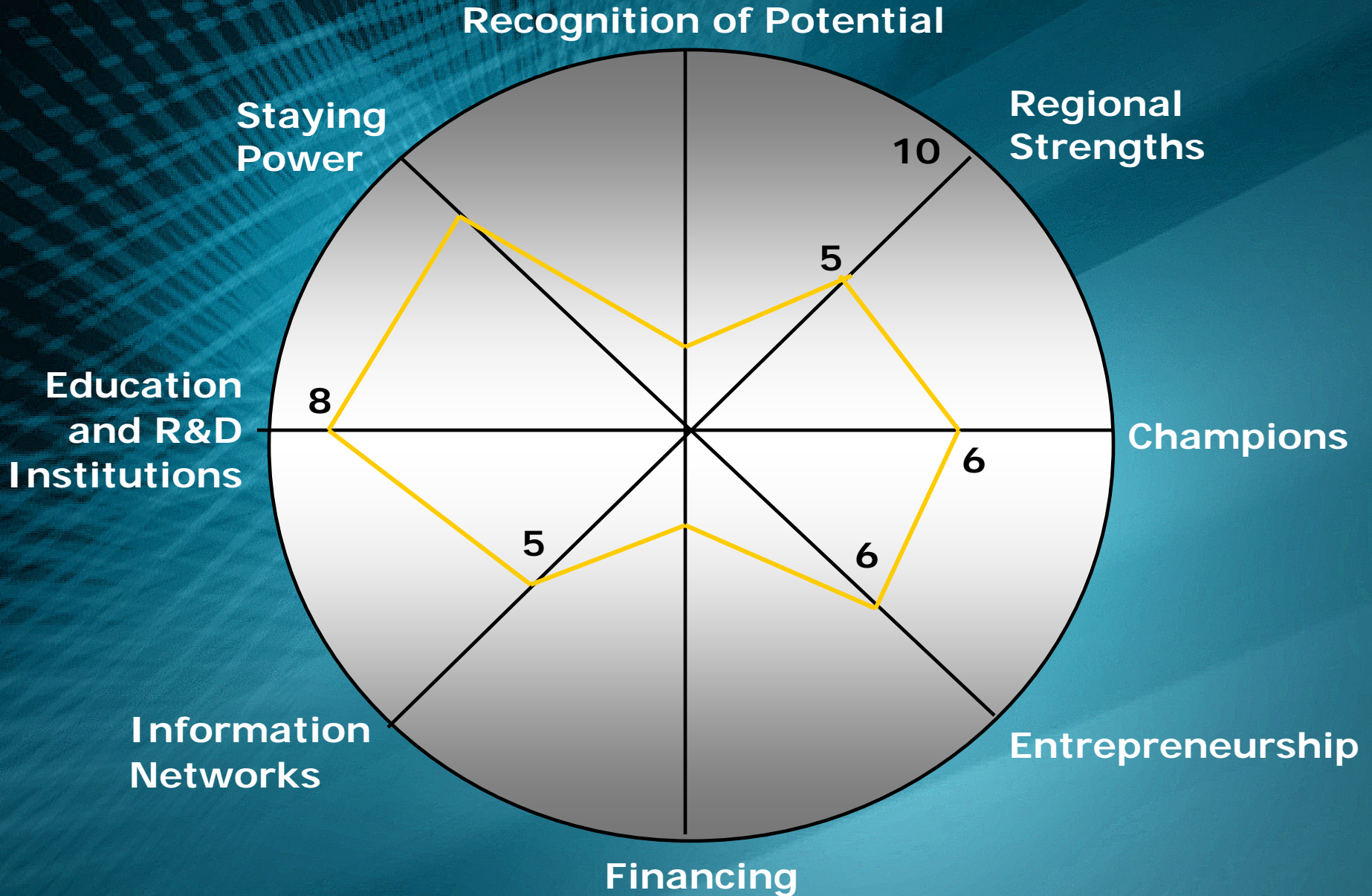
- ***Import***
 - campaigns to attract branch plants
- ***Grow-Your-Own***
 - assistance to local entrepreneurs
(business planning, accessing seed capital, etc.)
- ***Linkages***
 - informing local companies about opportunities in a major technology cluster or near-by area

Some Models For Analyzing Clusters

Eight Ingredients For Success

- Recognition of potential by local leaders
- Identification and support of specific local strengths and assets
- Influence of champions
- Entrepreneurial drive
- Various sources of financing
- Information networks
- Educational & research institutions
- Staying power

The PwC Model



Recognition of Potential by Local Leaders

Recognition of the opportunity usually comes out of meeting a need:

- Terman wanted job opportunities for Stanford graduates in California;
- Frêche wanted to diversify the Montpellier economy from tourism; and
- Japan's Technopolis program was aimed at regional development and alleviating pressure on Tokyo.

Champions are Important

- ***Individuals*** (e.g. Terman, Kozmetsky, Lafitte, Frêche)

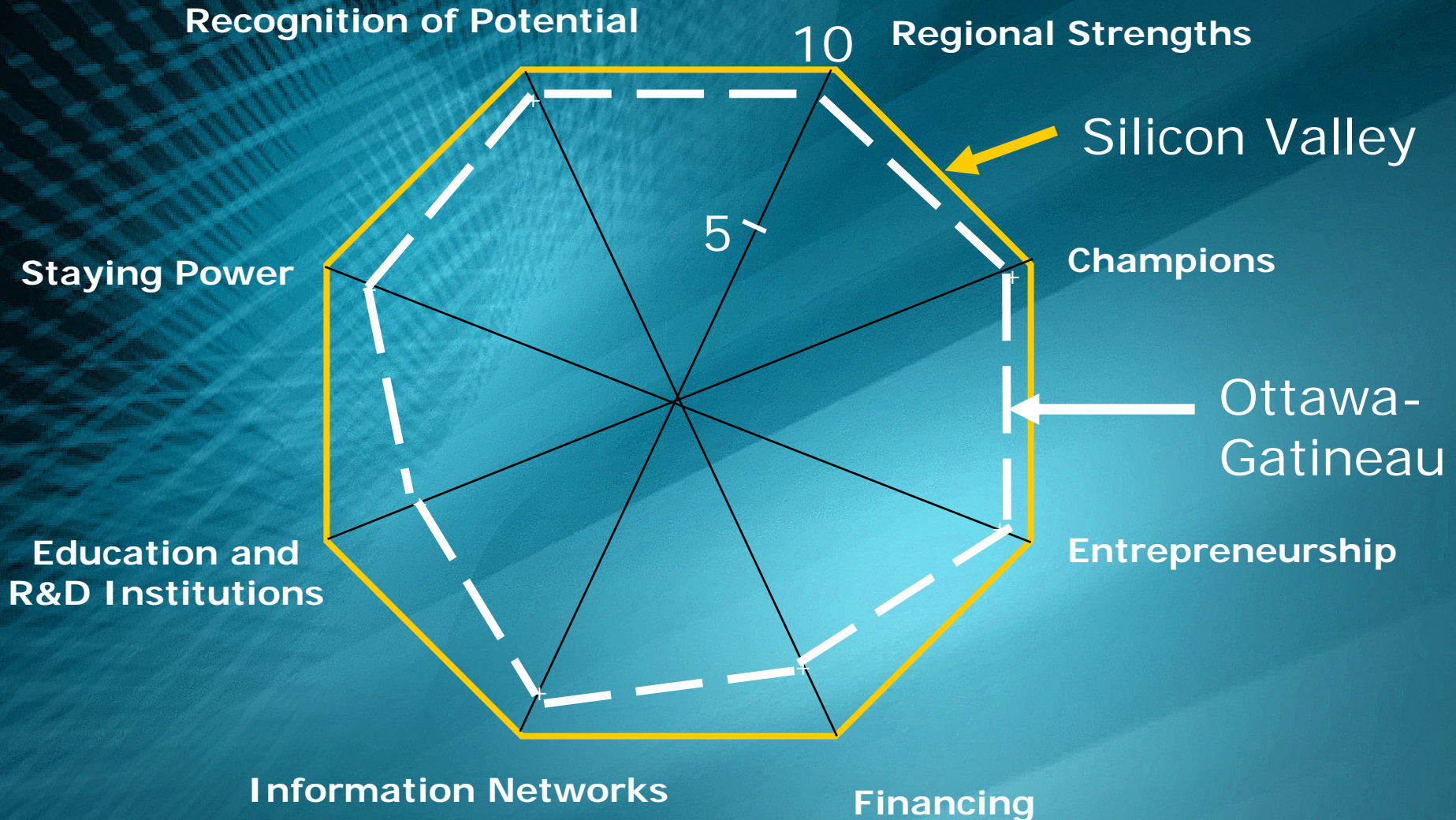
or

- ***Institutions*** (e.g. Chambers of Commerce, Economic Development Groups)

Information Networks

- Can be:
 - **Informal** where the focus is on the transfer of tacit knowledge (e.g. Il Fornaio Restaurant in Palo Alto; Starbucks at Pinecrest Mall in Ottawa)
 - **Formal** (e.g. Industry Associations, Chambers of Commerce)
- Where such structures are weak clustering suffers (e.g. Route 128)

Relative Status of Clusters

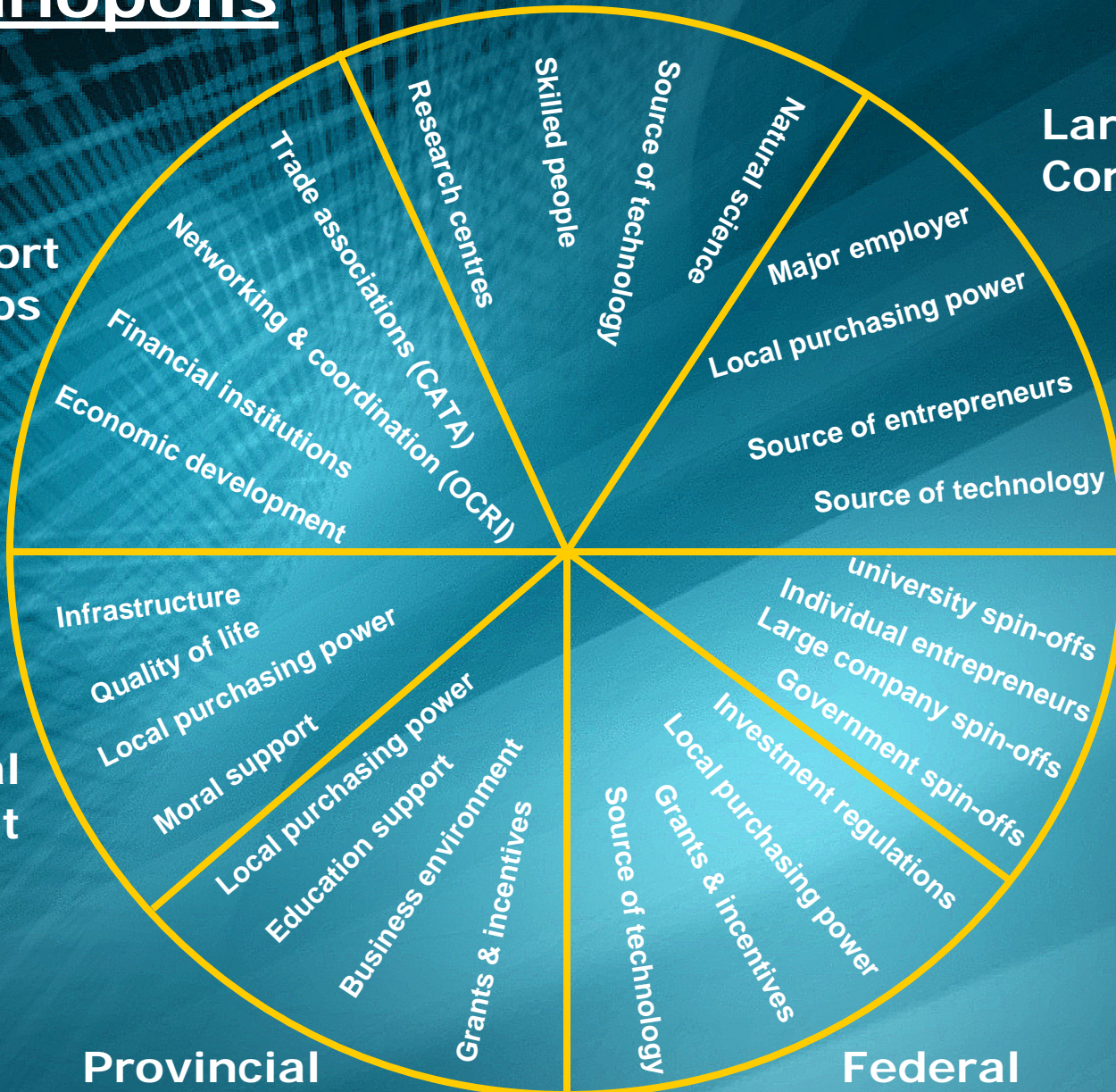


A Technopolis Wheel

University

Large
Corporations

Support
Groups



Local
Government

Provincial
Government

Federal
Government

Emerging
Companies

The Lennox Critical Mass List

- companies large enough to attract employees from other regions;
- employee mobility;
- several clusters in which there is global excellence;
- local champions;
- excellent education linkages and “flow-through” to industry;
- research laboratories;
- supporting service companies;
- specific capability for local angel investment;
- transportation, communication, and energy services; and
- a “business friendly” political climate

Some Words of Advice

- Don't let the nay-sayers discourage you
- Work with higher levels of government; they have the power and influence
- Develop strong networks both internally and externally
- Focus on the financing issue

The Reality of Making Technology Happen

Political Power

Federal

Provincial

Regional

Political Will



Hsinchu Science-Based Industrial Park - Taiwan

- Established in 1980 to emulate Silicon Valley and to lure back Taiwanese researchers working abroad. About half the firms in the park are run by returned Taiwanese;
- More than 220 firms with 60,400 employees and revenues of \$12 billion;
- 2 universities and a technology institute

Hsinchu Science-Based Industrial Park - Taiwan (cont'd)

- Specialization in computers, semiconductors, and telecommunications;
- Major incentives offered; 5 year tax exemptions, prefabricated factories, generous grants, etc.; and
- Government investment has been \$500 million since 1980.

Hsinchu: A Planned Cluster

- Recognition of potential by local leaders: government
- Support of local strengths and assets: government labs (e.g. ITRI)
- Influence of champions: politicians
- Entrepreneurial drive: returning ex-patriots

Hsinchu: A Planned Cluster (cont'd)

- Various sources of financing: government programs dominate
- Information networks: catalyzed by ITRI
- Education and research institutions: two universities and ITRI
- Staying power: nearly 20 years of sustained support

Bangalore: A Software Design Centre for MNEs

- Recognition of potential by local leaders: state government of Karnataka
- Support of local strengths and assets: low cost software skills base
- Influence of champions: politicians, scientific leaders (e.g. Tata) early-on
- Entrepreneurial drive: developing with more indigenous firms

Ireland: Assembly / Production Functions Moving Towards Design

- Ireland is now the second largest exporter of software after the U.S. (600 software firms);
- Transformation began in 1973 when Ireland joined E.U. and accessed major funds to build new infrastructure including two new technical universities;
- Attracted MNEs with incentives (e.g. 10% corporate tax rate) including Intel in mid 1980s

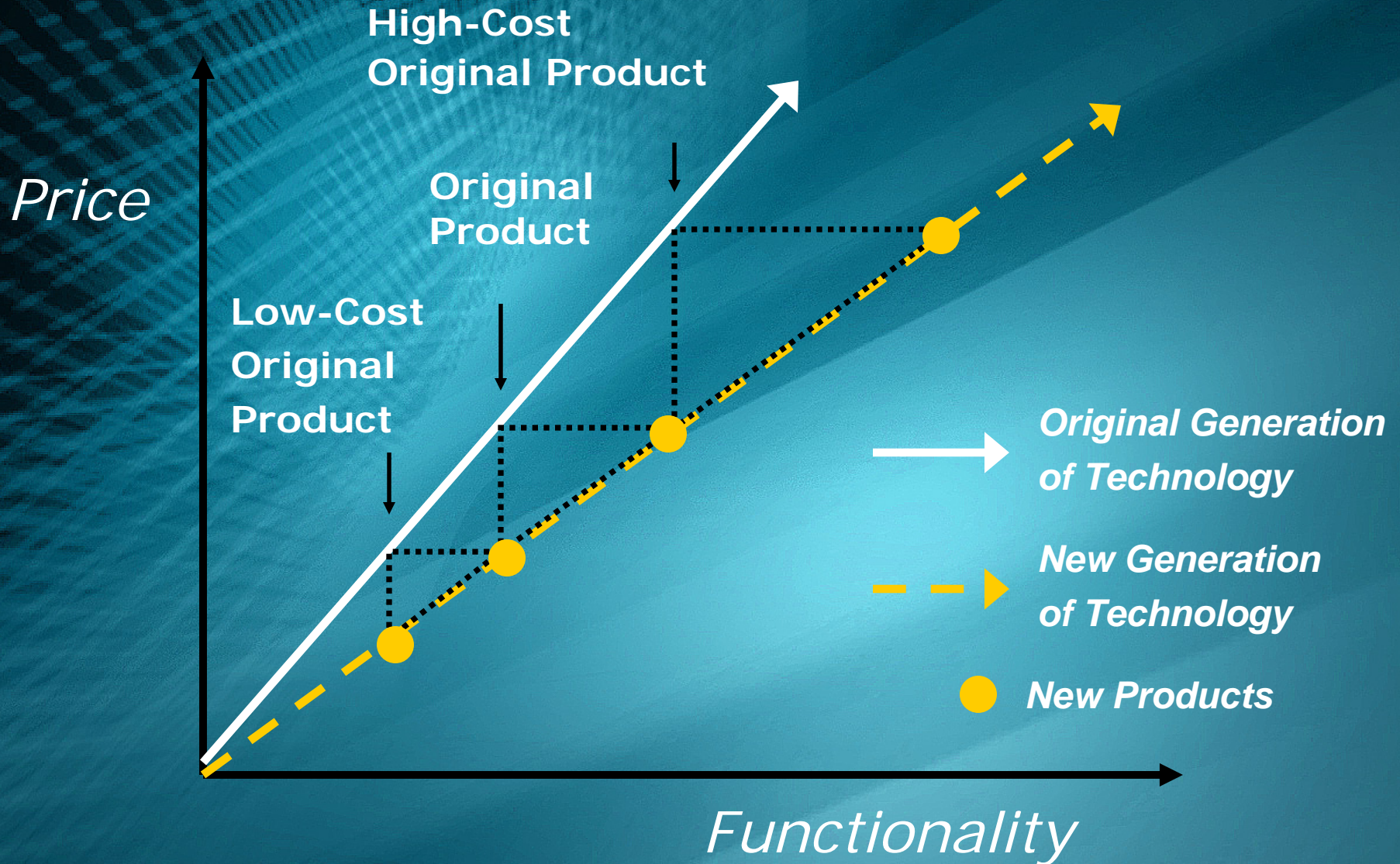
Ireland: Assembly / Production Functions Moving Towards Design (cont'd)

- Encouraged strategic partnerships between MNEs and local suppliers - especially for design and development;
- Encouraged the development of indigenous firms; 40 - 50 start ups each year;
- Encouraged export of software; and
- Consensual decision-making.

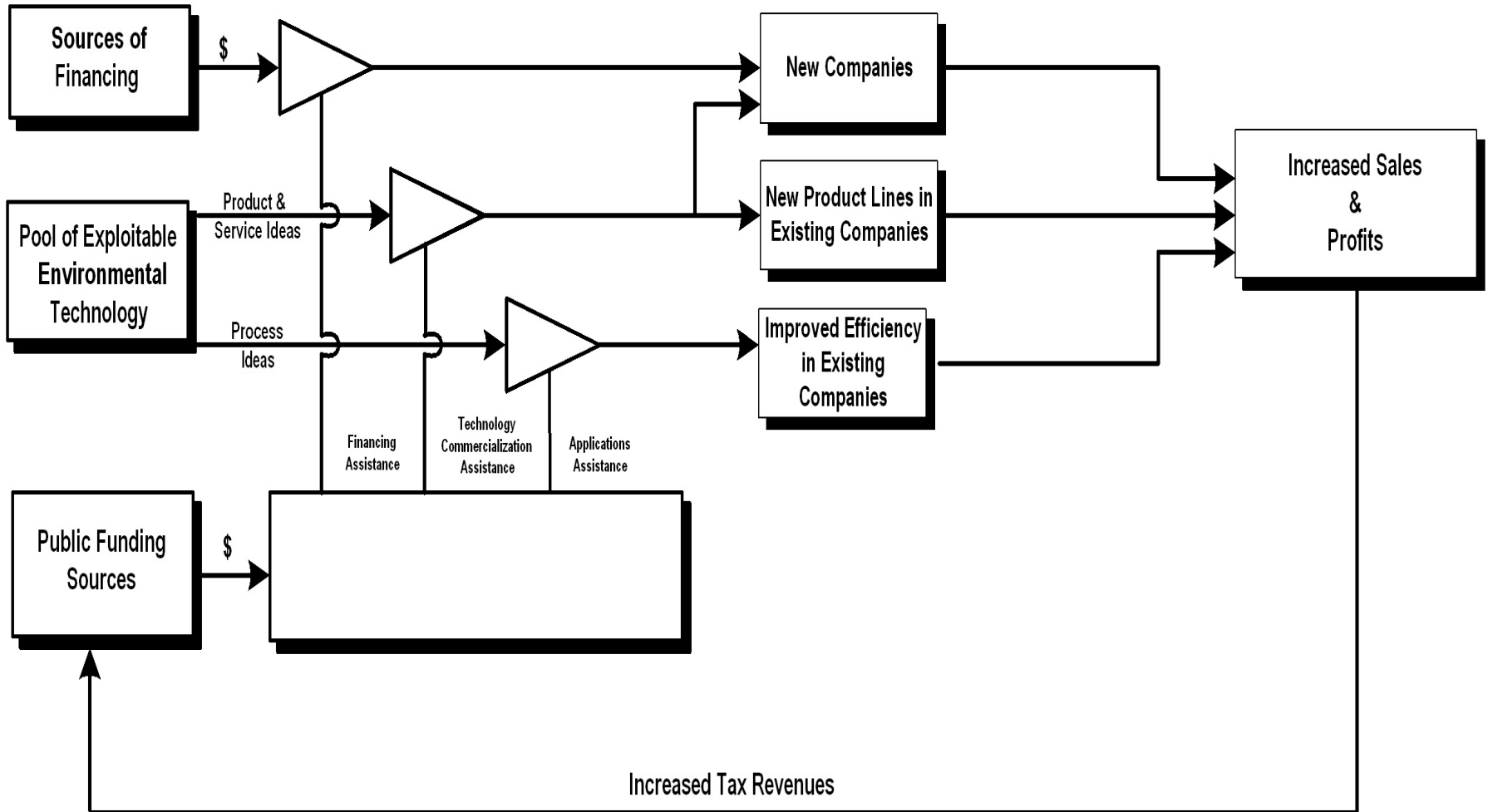
The Future of Clusters in North America

- The current Far East competition is different than anything experienced before
- China is not just a source of low-cost labour; it is (or soon will be) a source of leading edge technology
- North American companies will have to focus on higher product functionality
- Clusters will become multinational in scope (software in India, hardware in Scotland, R&D in Canada).

Product Migration Strategies



A Model For Measuring the Payback from Technology Commercialization



Achieving Critical Mass

November 2003