

# **Envisioning an Information and Communication Future for Western Australia**

**Information Paper prepared for the**

**Office of Information and Communications'**

**Industry Development Scenario Planning Workshop –**

**4 March, 1 999**

*Information and analysis  
provided to the OIC by:*

**Telesis Communications,**

*in conjunction with:*

**CyberResearch and  
Research Solutions**

# Table of Contents

<b>THE WA INFORMATION AND COMMUNICATION INDUSTRIES .....</b>	<b>2</b>
<b>GLOBAL TRENDS AND ISSUES.....</b>	<b>4</b>
GLOBAL ISSUES.....	4
NATIONAL ISSUES .....	7
<i>Investment-Driven</i> .....	10
<i>Innovation-Driven</i> .....	11
<i>Wealth-Driven</i> .....	11
<b>COUNTRY AND STATE CASE STUDIES.....</b>	<b>13</b>
AUSTRALIA .....	13
<i>New South Wales</i> .....	13
<i>Victoria</i> .....	13
<i>Queensland</i> .....	13
<i>South Australia</i> .....	13
CANADA.....	14
<i>Alberta</i> .....	14
<i>British Columbia</i> .....	14
<i>Ontario</i> .....	14
IRELAND.....	15
SINGAPORE: THE WIRED ISLAND	17
TAIWAN.....	20
<b>SUPPLEMENTARY CASE STUDIES.....</b>	<b>21</b>
FINLAND .....	21
INDIA (BANGALORE).....	21
ISRAEL.....	22
<b>WA “GOODNESS OF FIT” .....</b>	<b>24</b>

**The WA Information and Communication Industries**

## Global Trends and Issues

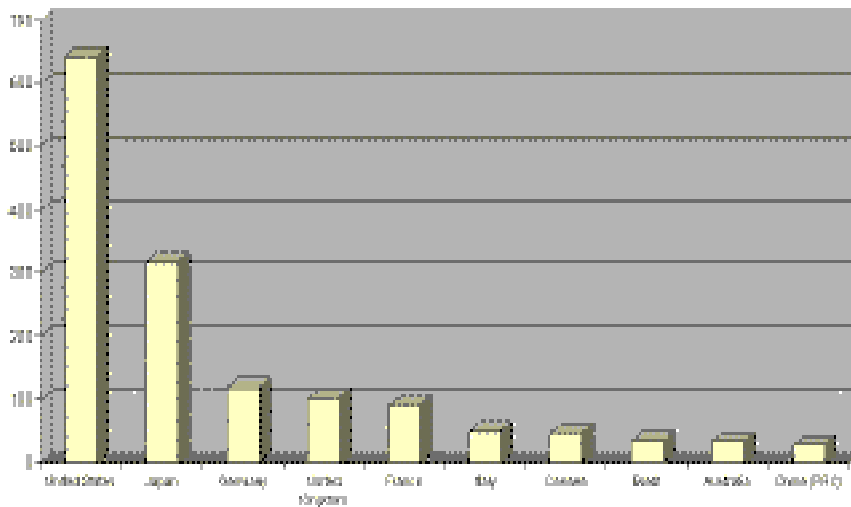
These trends and issues have been divided into two sections: those which are affecting all countries to a greater or lesser extent and those which are peculiar to Australia. They provide a very brief background picture to the detail which follows within the country and state case studies.

### *Global Issues*

- Developed economies are moving into the fastest growing sectors - information and knowledge-based industries and Elaborately Transformed Manufactures (ETM).
- Globalisation is driving increasing levels of competition in all markets. This trend carries the weight of law through the impact of GATT and the WTO<sup>1</sup> and their consistent drive to open markets. For national (and state) governments this has reduced their capacity for intervention.
- The extension of globalisation and GATT/WTO-approved policies has significantly expanded opportunities for Multi National Corporations (MNCs).
- In addition to the growing power imbalance between governments and MNCs there is a parallel imbalance in relation to industry information, especially at a global level. This is even more prevalent at a state or provincial government level where, combined with wide-spread labour market concerns, MNCs are able to exploit their positions easily.
- Information and Communication Technologies (ICT) are significantly changing the relationships between regions; between centralisation and decentralisation.
- The global information economy will be made up of big winners and big losers.
- Management is becoming significantly more challenging as the "steady state" era ends and is replaced by far greater volatility.
- These changes can be seen as a shift from the economics of transformation (epitomised by mass production) to the economics of transaction.
- In spite of recent economic uncertainty ICT industry analyst, IDC remains optimistic about growth in IT spending. It forecasts worldwide IT spending will grow 9.6% annually from US\$720.5b in 1997 to over \$1.1 trillion in 2002. Software, services and data communications will be the leading sectors.<sup>2</sup>
- From Net News 25 January 1998
-

- NET SHIFTS: January 24, 1999 - <http://www.idc.com/>
- Research firm International Data predicts a fundamental shift in the Internet this year. It says one-third of US homes will be online, women will become the majority Internet audience and the US will become an online minority. Internet users will surge 28% to 147m. giving the Net the same population as Japan. Net commerce will double, to US\$68 billion, the same scale as the GDP of Ireland and Poland combined - but the online economy is growing 30 times faster than the global economy.

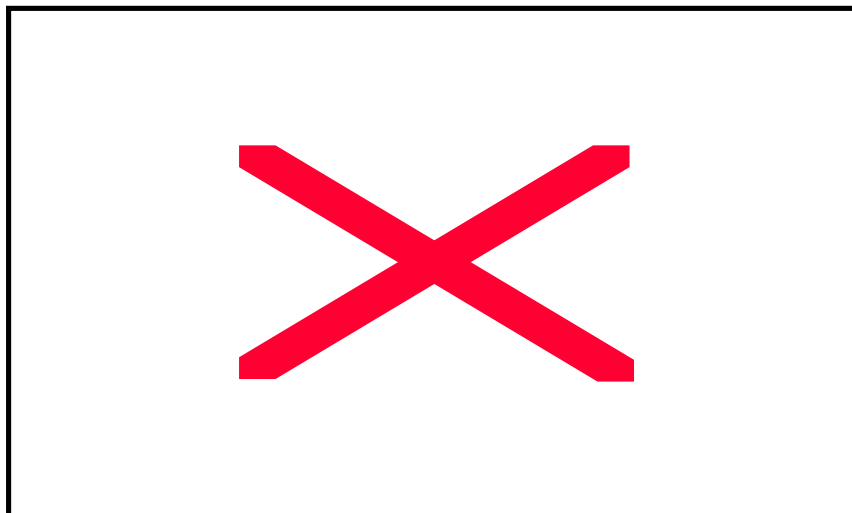
**Top Ten Countries Total IT Spending (1997) (in US \$bn.)**



Source: <http://www.witsa.org/tta.htm>

- Internet usage: Asia lags other world regions, it is estimated to currently have 12.2m. users, according to IDC which will increase to 35.3m. by 2002. (China 9.4m., Taiwan 3.3m., Hong Kong 2.43m., Malaysia 1.34m., Philippines 0.9m. and Singapore 1.37m.) Japan has 12.2m. users currently, 35.3m. by 2002; the United States from 56m. to 137m.; Western Europe - 28.9m. to 44.3m. <sup>3</sup>

**Secure WWW Servers for E-Commerce per 100,000 (August 1998)**

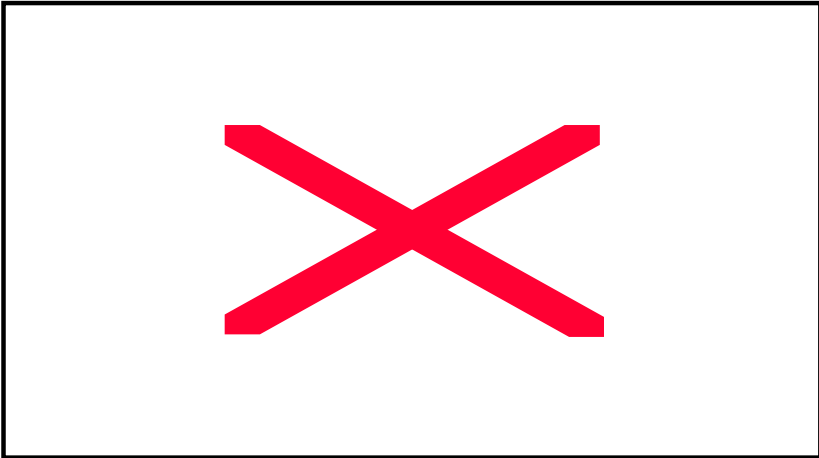


Source: OECD (1998)<sup>4</sup>

***National Issues***

- MNCs dominate Australia's Information Industries.
- Australia is a heavy consumer of (predominantly imported) Information and Communication Technologies (ICTs) which it does not use very productively. It has a massive trade imbalance in ICTs without always generating the productivity returns.
- Australia has an extremely low level of Information Industry exports.
- Australia's tax regime, particularly its capital gains tax rates, are considered extremely unattractive.
- The investment community tends to be risk averse (exploratory mining companies are an interesting and important exception to this). Investment strategies seem to be more often driven by investment retention than expansion.
- There is a low level of understanding and appreciation of each others' roles amongst Australia's researchers and investors in the process of commercialising technologies.
- Australia has an excellent record in research and development but a dismal history in commercialising this work.
- Australia owns relatively few global brands.
- Australia has traditionally had a narrow economic base dependent on commodities. Although the late 1980s and 1990s have seen a massive expansion in the service sector the bulk of this has been domestically-focussed.
- As with virtually all commodities, those Australia depends on have fallen in price and continue to fall.
- There are signs of a "brain drain" beginning to develop again.
- Australians generally excellent quality of life and their distance from the rigours and realities of global conditions has masked the speed and rate of economic decline and, possibly more importantly, our lack of preparedness for forthcoming changes.
- Is Australia's traditional anti-intellectualism an interesting quirk or a massive liability in a global knowledge economy?
- Internet use: In September 1998 IDC estimated Australian users at 3.6m., and predicted that number would grow to 5.76 million in 2002.<sup>5</sup> Although rapid we have slipped from fifth amongst OECD countries in July 1997 in terms of Internet penetration to ninth a year later and are now below the OECD average.

*Internet Hosts per 1,000 (August 1998)*



Source: OECD (1998)

### ***The Development of Competitive, Globally-oriented Economies***

To assist with the analysis of a number of selected nations and states, which follows, we have placed each case study along Michael E. Porter's Four Stages of National Competitive Development. In his *Competitive Advantage of Nations*<sup>6</sup> he says...

...economies progress by upgrading their competitive positions, through achieving higher-order competitive advantages in existing industries and developing the capability to compete successfully in new high-productivity segments and industries.

A nation's industries are either upgrading and extending their competitive advantages or falling behind. The mutual reinforcement of industries within clusters means that the upgrading process tends to spread. Attaining higher-order competitive advantage in one industry often helps other industries upgrade. Part and parcel of the upgrading process is *loss of position* in price-sensitive segments and in products involving less sophisticated skills and technology.

Porter says there are identifiable stages, although all countries do not pass through each of these stages, as their competitive advantages increase. He also says no country can be entirely confined to any one stage, they will all tend to have overlaps and sectors in many or all. The four stages are: **factor-driven**, **investment-driven**, **innovation-driven** and **wealth-driven**. The first three are stages of progress, the last is "one of drift and ultimately decline". Beneath the explanation of each of these stages is an indication of the relative importance of each of Porter's four determinates of national advantage.<sup>7</sup>

#### Factor-Driven

Nations in this stage will draw virtually all their advantages from basic factors of production; natural resources, good growing conditions for certain crops or abundant and cheap un-skilled or semi-skilled labour.

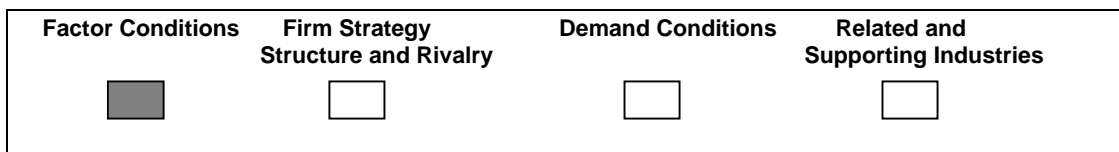
A nation's indigenous firms in such an economy compete solely on the basis of price in industries that require little product or process technology or technology that is inexpensive and widely available. Technology is sourced largely from other nations and not created.

...more advanced product designs and technologies are obtained through passive investments in turn-key plants...

...very few of a nation's firms at [the factor-driven] stage have direct contact with end-users. Foreign firms provide most of the access to foreign markets.

...[the] economy is sensitive to world economic cycles and exchange rates.

...while the possession of abundant natural resources may support a high per capita income for a sustained period of time, a factor-drive economy is one with a poor foundation for sustained productivity growth.



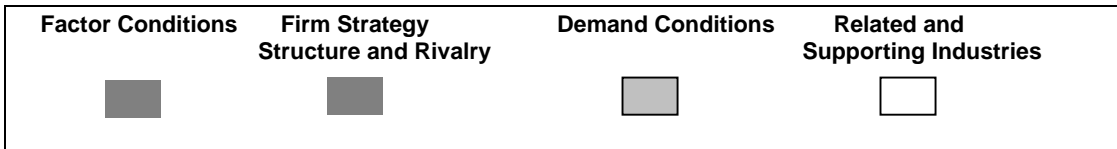
### Investment-Driven

At this stage industries are able and willing to make significant and aggressive investments. The investments are in production technologies and techniques – often bought in from overseas partners – as well as in improving and developing both the technologies and techniques. An individual level this translates into improved training and skills development. Firms develop their own links with overseas customers.

...competitive advantages are drawn from improving factor conditions as well as firm strategy, structure and rivalry. While a nation's firms still retain advantages in basic factor costs, competitive advantage widens ...

Product designs are at least one stage behind the world's most advanced. Process technologies are near the state of the art but do not advance it...the range of industries and industry segments in which the nation's firms can successfully compete is broader than in the factor-driven stage, and the industries have much higher entry barriers.

The investment-driven model requires a national consensus that favours investment and long-term economic growth over current consumption and income distribution.

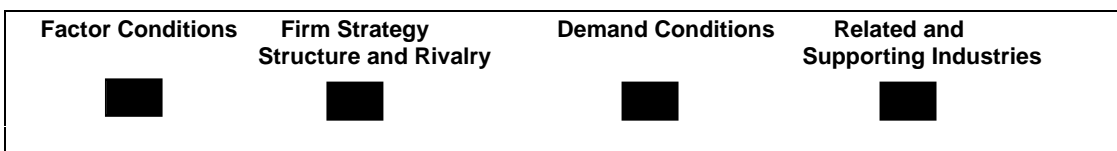


**Innovation-Driven**

In Porter's view nations at this stage are at their peak, they are exploiting all the factors. His definition of "innovation" is extremely broad and extends well beyond R&D to include all business practise. This means there is:

- a sophisticated domestic customer base which include locally-owned MNCs which introduce firms to global markets,
- related and supporting industries are well developed,
- the basic factor conditions have been upgraded and are becoming more specialised and
- firms develop global strategies.

This stage is called innovation-driven because firms not only appropriate and improve technology and methods from other nations but create them. A nation's indigenous firms push the state of the art in product and process technology, marketing and other aspects of competing. Each of the factor in Porter's diamond become self-reinforcing and encourage the development and growth of innovation-driven clusters in other industries.



**Wealth-Driven**

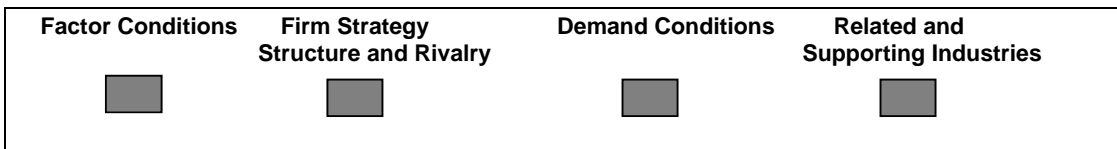
The driving force in this stage is the wealth that has already been earned. This brings a reorientation of focus away from building wealth to maintaining it; an approach which will ultimately lead to decline.

Declining rivalry between firms, a disinclination to invest, greater attention to retention of market positions rather than advancement and the ability of powerful firms to influence government to their advantage are often features of this stage.

Stewards ascend to senior management positions in place of entrepreneurs and company-builders. Belief in competition falls not only in companies but in unions, which both lose the taste for risk-taking. The compulsion to innovate diminishes as the willingness to violate norms and bear disapproval falls.

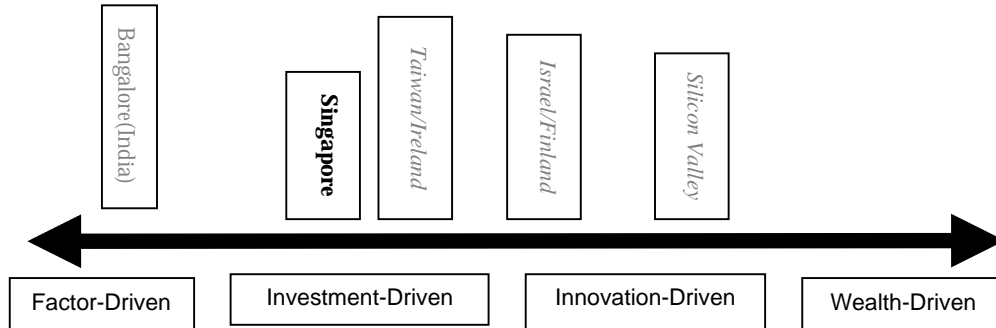
...management-labor relations harden as each side strives to preserve the status quo and its entitlement. This strains the ability of productivity improvements to keep up with rising wages.

Workers may gravitate from industry to other careers, capital often moves from capital accumulation strategies to capital preservation. This often converts into a move to increased merger and acquisition activities. "Companies, with cash-flow in excess of internal needs, seek rapid growth without risking start-ups."



## Country and State Case Studies

### Australia



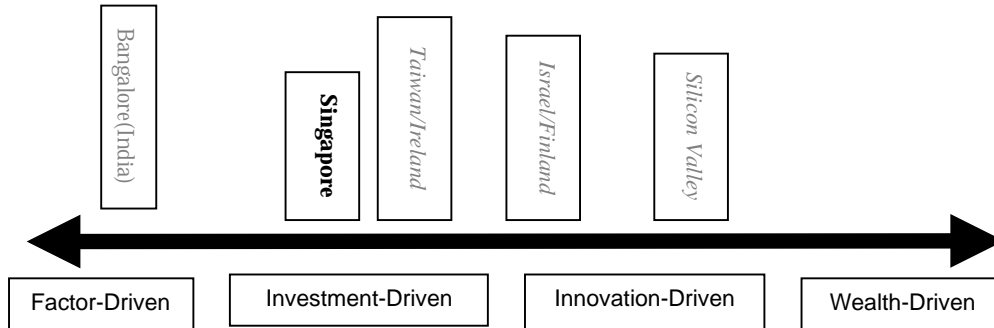
New South Wales

Victoria

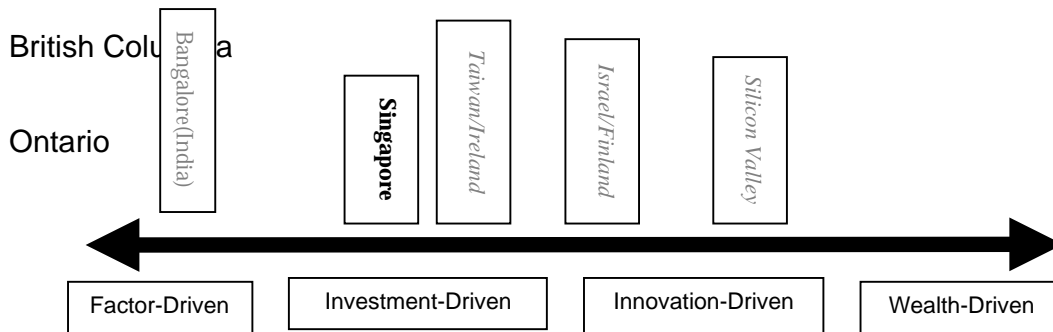
Queensland

South Australia

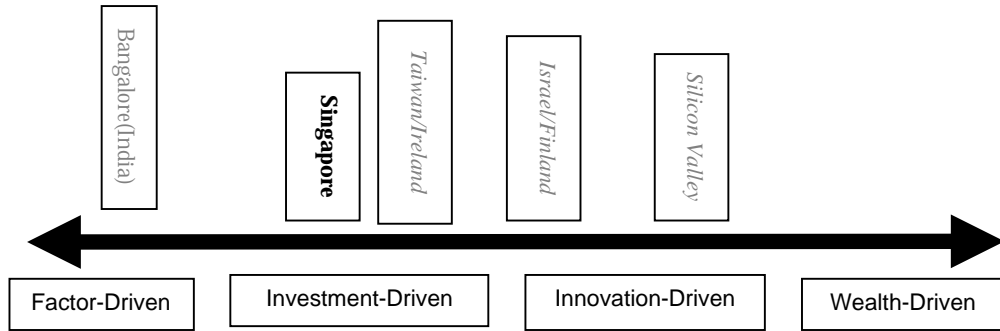
**Canada**

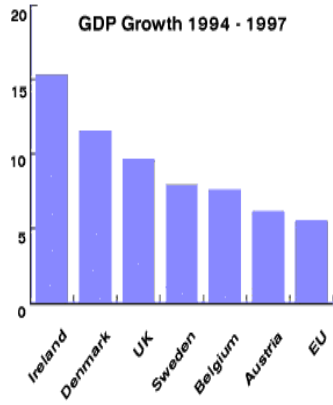


**Alberta**



***Ireland***





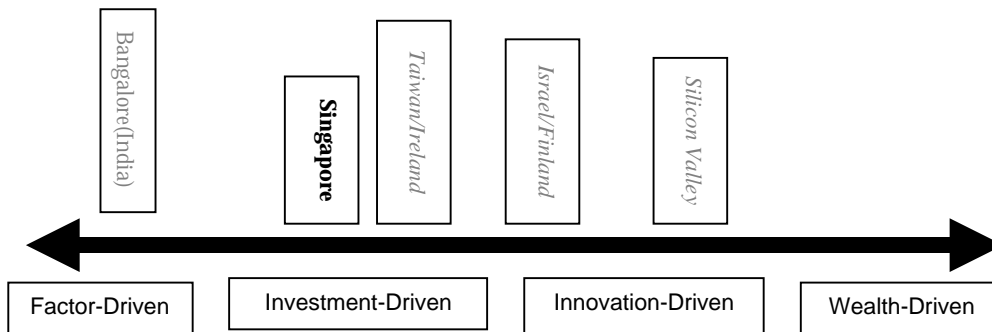
Source: [http://www.irish-trade.ie/economic\\_data/economic\\_data.html](http://www.irish-trade.ie/economic_data/economic_data.html)



Based on WTO (World Trade Organization) statistics:

[http://www.irish-trade.ie/economic\\_data/ECONOMIC\\_DATA\\_04.HTML](http://www.irish-trade.ie/economic_data/ECONOMIC_DATA_04.HTML)

# Singapore: The Wired Island



## Major Trading Partners 1997

### Exports

(Total: US\$125 bn)

1. US (18.4%)
2. Malaysia (17.5%)
3. Hong Kong (9.6%)
4. Japan ( 7.1%)
5. Thailand (4.6%)

### Imports

(Total: US \$132.4 bn)

1. Japan (17.6%)
2. US (16.8%)
3. Malaysia (15.0%)
4. Thailand ( 5.1%)
5. China (4.3%)

## STRATEGIC SUMMARY

The Singapore Government has traditionally taken a highly interventionist approach in industry development and the country's economy generally. The Government has refused to intervene in the local stock market and while government-linked companies exist, there is little evidence of the nepotism and corruption found in many other Asian economies.

A major deficiency with Singapore's top-down approach is that efficiency has been an end in itself. There has been little encouragement of entrepreneurialism within the private business community. An example is the government's pursuit of the best talent the country has to offer: Singapore certainly has a few world-class entrepreneurs, but it has a much larger number, at least proportionally, of world-class civil servants.

### Critical Success Factors

- Emphasis on ICT in all policies and a long-term focus;
- Encourages investment, attractive personal and corporate tax levels;
- Strong support for National Information Infrastructure project;
- Significant clustering initiatives;
- Strong representation of industry by the government body. One-stop shop for foreign companies interested in investment;
- Government provides infrastructure that improves on industry factors and good regulatory structure;
- Government as a lead-user of ICT; and
- Bilingualism of the well-educated population and the access it provides to the Chinese diaspora.

<b>Company Case Study</b>	<p><b>SECTORAL SUCCESS FACTORS:</b></p> <p><b>Labour</b></p> <p>Growth of 11% for IT labour demand over the next two years.<sup>8</sup>          Has extensive programs to attract foreign skilled labour, upgrade labour skills, and train skilled workers.<sup>9</sup>          There is a strong emphasis on science and technology (S&amp;T).<sup>10</sup></p> <p><b>Capital</b></p> <p>Singapore has aggressive investment attraction policies.<sup>11</sup></p> <p><b>Venture Capital</b></p> <p>Singapore's venture capital industry now manages S\$8.8 bn.<sup>12</sup></p> <p><b>Tax</b></p> <p>Singapore falls into the medium-tax jurisdiction. The corporate tax rate is 31 percent, and personal tax rates are a maximum of 33 percent. There are no capital gains taxes in Singapore.<sup>13</sup></p> <p><b><i>Efficiency of capital markets</i></b></p> <p>Has efficient capital markets and portfolio investment.<sup>14</sup></p> <p>Singapore tops emerging nations in access to capital markets.<sup>15</sup></p> <p><b><i>Private and government funding</i></b></p> <p>Active support of government-linked firms to the disadvantage of SMEs. Several factors hamper would-be Singapore entrepreneurs:</p> <ul style="list-style-type: none"> <li>• multinationals and large government-linked groups that dominate the economy have the clout and connections to squeeze out potential competitors</li> <li>• prospective start-ups find it difficult to access the capital they need to grow;</li> <li>• risk-averse banks and investors have long preferred the safety of property to the uncertainty of an enterprising idea.</li> </ul> <p>According to a US Government report (1997), the Singapore government and government-linked businesses create about 60% of Singapore's GDP. Over the past 20 years, about 80% of manufacturing investment has come from multinational firms.<sup>16</sup></p> <p>Singapore's economy is dominated by government-linked companies (GLCs) and large foreign multinational corporations. GLCs straddle all major sectors of the economy, while MNCs concentrate mainly in the electronics and chemicals industries.<sup>17</sup></p> <p><b><i>Resources - Telecommunications infrastructure</i></b></p> <p>Singapore has a highly developed telecommunications infrastructure. The phone line penetration rate rivals that of developed countries. About a quarter of Singaporeans have mobile phones and almost half own pagers.</p>
<b>STILL TO COME</b>	

Singapore is constructing a multimedia broadband network that will encompass the entire island.<sup>18</sup>

Singapore is Asia Pacific's most competitive telecom hub.<sup>19</sup>

***Regulatory structure provided by government***

Good regulatory structure provided by government, absence of corruption. Stable political system with minimal opposition and ability to implement long-range planning

Singapore is well-known in business circles for its clean, corruption-free government. When cases of corruption are uncovered, the government deals with them harshly, swiftly and publicly. (Note: There were 15 reported cases of corruption in the 61,000 strong civil service in 1996.)<sup>20</sup>

**Domestic Demand**

Singapore residents are very comfortable with IT, and are very demanding customers. In 1997, over 90% of private sector firms which employed ten or more people used computers for business while penetration in government is 100%. Recent surveys indicate that one in three households owns a computer.<sup>21</sup>

***Extent of government influence***

Government leadership in driving the demand for ICT through government-wide computerisation strategy within departments.<sup>22</sup>

***Trading partners (understanding of language and culture)***

Population is bilingual in Chinese and English. Aims to be Chinese-language cyberhub.<sup>23</sup>

**RELATED AND SUPPORTING INDUSTRIES**

***R&D: private and public***

Traditionally an area attracting strong support.<sup>24</sup>

***Education and training***

Singapore has invested heavily in the sector: It has 14 junior colleges and four centralised institutes, two universities, four polytechnics, and 34 technical and commercial training institutes/centres.<sup>25</sup>

***Coordination of industry***

Strong representation of industry by the government body EDB. Also provides a one-stop shop for foreign companies interested in investment.

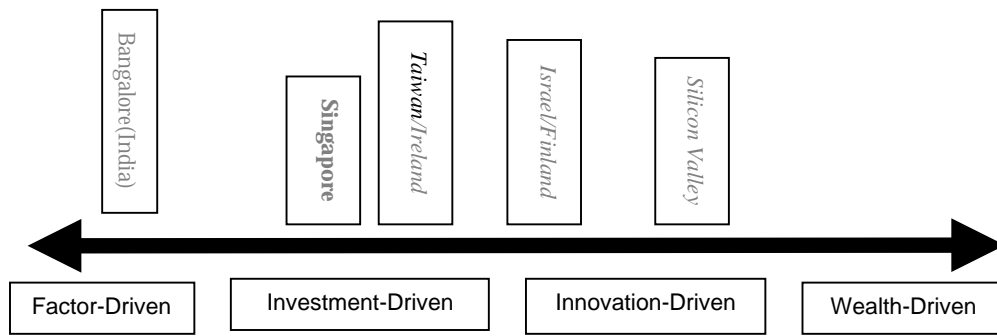
***Company strategy and structure - Clustering***

In 1997, the Cluster Development Fund was increased by S\$1 bn, bringing the total to \$2 bn.<sup>26</sup>

The National Computer Board has its own \$200 mn Cluster Development Fund specifically to facilitate the development of IT2000 projects and to nurture new IT industries.<sup>27</sup>

The Government supports the development of industrial parks within the country and also in emerging countries: Vietnam, China, etc.<sup>28</sup>

**Taiwan**



**STRATEGIC SUMMARY**

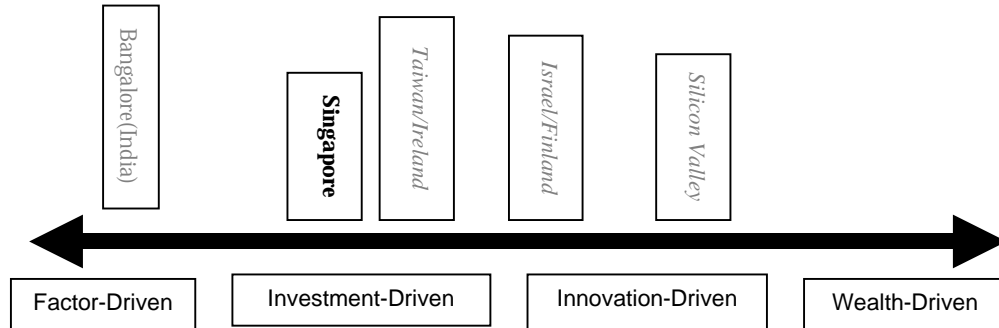
**CRITICAL SUCCESS FACTORS**

Company Case  
Study

STILL TO COME

## Supplementary Case Studies

### *Finland: Fast turn-arounds on ice*



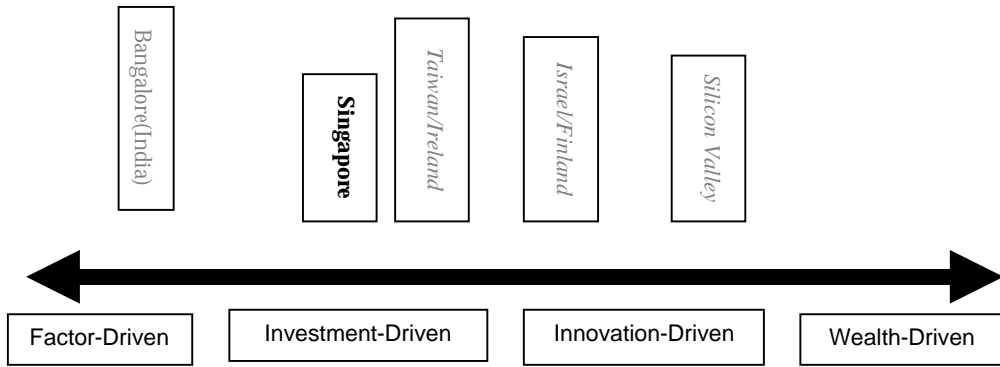
### STRATEGIC SUMMARY

### CRITICAL SUCCESS FACTORS

Company Case  
Study

STILL TO COME

**India (Bangalore): Global Backroom Programmers**



•  
**Company Case Study**

STILL TO COME

*Israel*

**WA “Goodness of Fit”**

---

## Notes

- <sup>1</sup> The General Agreement on Tariffs and Trade and the World Trade Organisation
- <sup>2</sup> IDC January 7, 1999 Press release. <http://www.idc.com/Press/010799Apr.htm>
- <sup>3</sup> [http://www.techserver.com/newsroom/ntn/info/090998/info14\\_3456\\_noframes.html](http://www.techserver.com/newsroom/ntn/info/090998/info14_3456_noframes.html)
- <sup>4</sup> "Internet Infrastructure Indicators", Working Party on Telecommunication and Information Services Policies, Organisation for Economic Co-operation and Development, 28-Oct-1998. (<http://www.oecd.org/dsti/sti/it/cm/prod/tisp98-7e.htm>)
- <sup>5</sup> [http://www.techserver.com/newsroom/ntn/info/090998/info14\\_3456\\_noframes.html](http://www.techserver.com/newsroom/ntn/info/090998/info14_3456_noframes.html)
- <sup>6</sup> Porter, Michael E., "The Competitive Advantage of Nations", The Free Press, New York, 1990, pp. 544-560
- <sup>7</sup> A detailed explanation of these factors is at Porter, 1990, pp.71-130
- <sup>8</sup> <http://www.ncb.gov.sg/ncb/press/060498.asp>
- <sup>9</sup> detailed in: IT Manpower Policy <http://www.ncb.gov.sg/itpolicy/singapore/ntu/ss/manpower.html> and IT POWER21 policy <http://www.ncb.gov.sg/ncb/imd/info/itpower21.asp>
- <sup>10</sup> <http://www.geog.buffalo.edu/Geo666/mackun/hk.html>
- <sup>11</sup> <http://strategis.ic.gc.ca/SSG/da91650e.html> and <http://strategis.ic.gc.ca/SSG/dc91972e.html>
- <sup>12</sup> [http://www.sedb.com/cf-bin/Choose\\_Display\\_Template.cfm?ID=5&ArticleID=1524](http://www.sedb.com/cf-bin/Choose_Display_Template.cfm?ID=5&ArticleID=1524)
- <sup>13</sup> <http://strategis.ic.gc.ca/SSG/dc91972e.html>
- <sup>14</sup> <http://strategis.ic.gc.ca/SSG/da91650e.html>
- <sup>15</sup> [http://www.sedb.com/edb\\_corp/How/others3.html](http://www.sedb.com/edb_corp/How/others3.html)
- <sup>16</sup> [http://www.feer.com/Restricted/98aug\\_6/cover.html](http://www.feer.com/Restricted/98aug_6/cover.html)
- <sup>17</sup> [http://www.state.gov/www/about\\_state/business/com\\_guides/1999/eastasia/sing99.html](http://www.state.gov/www/about_state/business/com_guides/1999/eastasia/sing99.html)
- <sup>18</sup> [http://www.state.gov/www/about\\_state/business/com\\_guides/1999/eastasia/sing99\\_02.html](http://www.state.gov/www/about_state/business/com_guides/1999/eastasia/sing99_02.html). Singapore ONE: <http://www.s-one.gov.sg/>
- <sup>19</sup> [http://www.sedb.com/edb\\_corp/How/others5.html](http://www.sedb.com/edb_corp/How/others5.html)
- <sup>20</sup> [http://www.state.gov/www/about\\_state/business/com\\_guides/1999/eastasia/sing99\\_07.html](http://www.state.gov/www/about_state/business/com_guides/1999/eastasia/sing99_07.html)
- <sup>21</sup> <http://www.infoexport.gc.ca/viewmarketbse.asp?name=33359&country=38&continent=Asia>) and also the IT Household Survey Report 1996 <http://www.ncb.gov.sg/ncb/hholdsurvey/index.html>
- <sup>22</sup> <http://www.ncb.gov.sg/itpolicy/singapore/ntu/dd/cscp.html>
- <sup>23</sup> <http://www.upside.com/texis/mvm/story?id=367058250>
- <sup>24</sup> Details are available from 1997 National Survey of R&D in Singapore: <http://www.nstb.gov.sg/nstb/web/UPDATES.NSF/a3faa491158c94825664e0025bcc6/716c01d2eachbed482566d0000b8942?OpenDocument>
- Also see review for R&D 1997 at: <http://www.nstb.gov.sg/NSTB/web/Updates.nsf/d56486ad4463b0d64825663900032529/9f02af9cb58ceac48256641007f65d2?OpenDocument>
- <sup>25</sup> <http://www.singstat.gov.sg/FACT/SIF/sif20.html> for statistics <http://www.sg/flavour/profile/pro-education.html>
- <sup>26</sup> [http://www.sedb.com/edb\\_corp/How/chair98.html](http://www.sedb.com/edb_corp/How/chair98.html)
- <sup>27</sup> <http://www.ncb.gov.sg/ncb/cdfund.asp>
- <sup>28</sup> <http://www.sciencepark.com.sg/> and [http://www.sedb.com/edb\\_corp/How/glo97.html](http://www.sedb.com/edb_corp/How/glo97.html)