

***Prospects for an
Australian Semiconductor
Industry.....***

***A Post Goldsworthy
Perspective***

by

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La Trobe Univ.**

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1. ***Why? A Statement of the obvious***

- *Semiconductor technology is the base enabling technology for all IT product development,*
- *Currently, about 20% of global population use IT intensively,*
- *Semiconductors naturally included in many consumer products,*
- *Gaping crevices in current PC/IT product concepts,*
- *Major investment and profit-taking opportunity for Australian investors*
- *Several countries on Pacific Rim have made profitable investments which are boosting exports*
- *Produce product, or contribute to others bottom lines*

1. **Why? A Statement of the obvious***(cont'd)*

→ *International market*

**US\$150B,
growth 20% p.a. (1990-1995)**

→ *In the 1960's, Australia was the most industrially advanced country in the region.. have we REALLY given up?*

→ *Australian Super funds have \$100B's to invest...why not IC's?*

→ *IT is currently about \$37B p.a. of the Australian Economy.. we need large Australian presence in production*

The IT Industry... broad picture...

COMPUTER RELATED IT (CRIT)

...

⇒ US\$567B P.A.

***⇒ Australian CRIT A\$15B
(US\$12B)***

***⇒ All Australian IT... A\$30B+
(US\$24B)***

✈ Ericsson's total T.O. US\$15B!!

2. *How? Examples from Overseas*

→ *In most cases, major government initiatives have stimulated IC production*

Korea, national initiative, Gov't funding, plus "market reservation"... now world leader in key IC technology...

Japan, succession of MITI initiatives in leading edge R&D, "national" labs...

Europe, ESPRIT lead to ARM, Germany, France, Sweden have had national projects...

Singapore, TECH Semiconductor, joint with Singapore EDB, HP, TI, Canon

Even US gov't initiatives..

2. *How? Examples from Overseas(cont'd)*

Korea,

- ∩ began with bonding and packaging,
- ∩ moved to low-scale IC fab.
- ∩ **purchased** plants directly from US sources,
- ∩ ***CURRENTLY ESTABLISHING PLANTS USING KOREAN TECHNOLOGY THROUGHOUT THE WORLD!!!***
- ∩ Many Korean IC activities are (very large) subsidiaries of (even larger) conglomerates... (Australian equivalent... BHP setting up in IC's..)
- ∩ Korea... summary..
 - § ***Long Range Plan for Electronics Industry (1982)***
 - § ***Long Range Plan for Semiconductor Industry (1982)***
 - § ***Master Plan for the creation of the Computer Industry(1982)***

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3. What? Strategies for Market Entry... Some Issues

- **Player or Spectator?...**
supplier or buyer?

- **Bleeding Edge or Wave Follower?**
Where did Daewoo, Hyundai, Proton, Volvo enter the car market, Japan the camera market?

- **Gate-count/speed for volume markets?**
*Not all applications need 10^7 gates
200Mhz!*

- **Impact of per capita GDP on product opportunity**
Consider this in context of Pacific Rim countries

- **RESULT... multi-faceted approach leading to Australian owned, multi-billion \$ companies by 2015**

3. What? Strategies for Market Entry... A Possible Program

- **Select technology for maximum support for current industry, market prospects and optimum entry cost... Probably around 0.6micron**
- **Buy plant, as joint venture between Australian and OS investors, Choose a medium sized partner in IC, who needs access to Pacific Rim, Draw Australian investors into the industry**
- **Expand teaching and Research in Univ's.... Equip to world's best practice, expand semi-con physics, device physics, electronic design...clean-rooms, etc.**
- **Establish national labs in semi-con physics, device physics, electronic design**
- **ESTABLISH 'FUTURES' PROJECTS**
Todays products are "vendor-market dominance driven"....
Needed, off-the wall product-concepts demonstrated using current technology
skunk-works

*4. Who? The \$.9B.p.a.IT
Research Short-fall &
Australian Investors*

***IT Research is under
funded***

IT overall \$33B! (BIE)

*IT research is under-funded in two
areas compared to primary
sector...*

*a) Government "funded" "Industry"
directed R & D (Primary Industry
research corps.) is 1% of turnover.*

*b) CSIRO divisional support is
roughly 1 Divison for each \$2B of
T.O (10 Divisions, av. size \$28M
p.a.)*

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Basic IT Industry Stats...

IT overall \$33B! (BIE)

Industry based R & D should be

\$330Mp.a.

(PFD av R & D percentages < average for electronics and computing)

CSIRO IT activity, is below that for a comparable industry sectors

Based on 1996 budget , primary industry has about 1 Division for each \$2B p.a. of T.O. (Primary Industry Divisions \$..

CSIRO should have 10 or more Divisions in IT!

The Case for major IC Research Initiative

At State level Primary Industry ...

✈ well supported by Govt.

✈ Direct Govt participation in Primary CRC's (4)...(Catchment Hydrol., MW; Intl. Food Man. & Pack., Dept. Agr.; Viticulture, Dept. Nat. Res.; Weed Man., Dept. Nat. Res.)

⇒ Non-IT CRCs have very heavy industry sub-sector specific focus.supported by (primary) industry research corps.

✈ Indirect Vic-govt participation in IT CRC's (2,not sub-sector specific... Res. Data Net., CITRI; Intel. Dec.,AAll)

✈ Primary have two times no. CRC's

✈ Multi-Media being encourage (Important start-up industry)

R & D Short fall due to CRC's.. ~\$400m p.a.

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The Case for IC Research Initiative

Short fall in IT R & D...

Ind. R & D Corp.'s ~\$330M p.a.

CSIRO ~\$240M p.a.

CRC's ~\$400M p.a.

TOTAL ~\$970M P.A.

The Case for an SEI(cont'd)

**Short fall
in Computer Related IT
R & D...**

Ind. R & D Corp.'s ~\$150M p.a.

CSIRO ~\$100M p.a.

CRC's ~\$200M p.a.

TOTAL ~\$450M P.A.

In Summary...

The Problem...

An industry of national importance, and one critical to Victoria, is under-resourced in terms of industry specific R & D.

The Industry experiences a failure of current resource allocation in Australian factor markets... in this case, R & D, and capital

Potential difficulties in maintaining and expanding its competitive position over time.

The Solution...

A multi-tiered approach to R & D, and industry development, funded and promoted by Government

WHY?

WORLD'S BEST PRACTICE!

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4. *Who? The \$.9B.p.a.IT Research Short-fall & Australian Investors*

- o Educate large-scale investors,
- o Provide tax incentives and direct funds
- o **Choose foreign partners who need the breaks, and will transfer the IP..**
- o **Reserve some market sectors for the new operations**
- o **Convince Super funds and largest Australian companies to diversify.**

5. *Impediments? Distractions, the Australian Disease-delusions of grandeur*

Ω **The “big project” syndrome...**
care needed to avoid large, costly initiatives with simple titles appealing to politicians..
e.g. HPCI

Ω **“Nobel Prize” winning projects and centres..**
Of course, but the real commercial action is closer to the coal face..

cf. WWW, Windows, RISC, ARM, NC, VHST, Space Office, MFP

Ω **Attracting state-of-the-art fab facilities.**
Perhaps, but that wasn't how Korea got to where it is..

Ω **The risk of yet more reports and studies..**
Studies would be against Government's firm commitment to take action.

In conclusion

- Ω **THE GOLDSWORTHY, BUCKERIDGE/
ALLEN AND MORTIMER REPORTS
CREATE A UNIQUE OPPORTUNITY...**
- Ω **HIGHEST LEVEL OF POLITICAL
COMMITMENT EVER,**
- Ω **ENDORSE UNEQUIVOCALLY PREVIOUS
SUBMISSIONS BY REPEATING THE
OLD ARGUMENTS..**

***IN THE MEANTIME, THE
INTERNATIONAL
MARKETS GRADUALLY
CLOSE TO
UNSOPHISTICATED
COUNTRIES...***

THANK YOU!