Can Sub-national States be 'Developmental'?
The Cases of Penang and Karnataka

by

Francis Edward Hutchinson

A dissertation submitted for the degree of
Doctor of Philosophy
of
The Australian National University

2006
Declaration

I hereby declare that this thesis is my own original work, except where due reference is made to the work of others.

Signature: ______________________________

Date: 13/12/2006
Can Sub-national States be 'Developmental'?
The Cases of Penang and Karnataka

Abstract

The Developmental State school argues persuasively that states with high bureaucratic capacity, close ties to the private sector, and that relentlessly pursue economic development have been able to transform their economies. However, through its conventional application, this theoretical approach is not suited to exploring different economic outcomes between regions within a country.

Yet, many countries that are not bestowed with 'developmental' states contain high-performing sub-national economies. If economic performance is affected by market institutions and their interaction with state and other social institutions, it is pertinent to ask whether these economies are influenced by their local-level institutional contexts and, in particular, state institutions.

Thus, the question that this thesis asks is 'Can sub-national states play an influential role in promoting economic transformation?'

To answer this question, this thesis combines elements of institutional political economy and institutional economic geography to apply the Developmental State framework at the sub-national level. It then applies this framework to two high-performing sub-national economies in order to understand how their political and institutional characteristics have influenced their economic trajectories. The two cases, Penang, a state in Malaysia, and Karnataka, a state in India, are dynamic locally-based economies and have emerged, within their countries, as market leaders in the electronics and software sectors, respectively.

In applying this framework, this thesis makes the following four arguments.

First, sub-national states can be 'developmental', playing a pivotal role in fostering economic transformation at the local level – even in countries where the national state is not able to successfully foster economic growth and upgrading.

Second, as with their national counterparts, the effectiveness of sub-national states at fostering economic transformation is shaped by their institutional capacity, policy priorities, and relationship with the private sector.

Third, in addition to these characteristics, sub-national states need: sufficient autonomy from national-level directives to pursue their own policy goals; inclusive relations with different private sector constituencies, in particular small firms; and a supportive political context for the prioritization of economic growth.

Fourth, policy needs for economic transformation change over time, requiring different measures as firm clusters grow and mature. 'Developmental' combinations of bureaucratic capacity and communication with the private sector must evolve in tune with this, as while both sub-national states provided – with varying degrees of success – the initial conditions for their sectors to emerge, the more subtle and long-term measures needed to create an innovative environment for firms were eventually beyond their capacities.
Acknowledgements

In spite of its long and lonely nature for the student, a PhD thesis is actually a collective effort. I would like to thank some of the many people that made this thesis possible.

During the course of my fieldwork, I came across a range of people with varying dispositions to help a lone PhD student. While some were unwelcoming, others went out of their way to help a stranger access data of a strange and esoteric nature. Of the one hundred policy makers, entrepreneurs, academics, and journalists I interviewed, I would like to specifically thank several key people. They are: Neil Khor and John David of the Star Newspaper in Malaysia; Suresh Narayanan and Francis Loh of Universiti Sains Malaysia; the staff of the National University of Singapore Library; Anand Parthasarathy of the Hindu newspaper; Deepak Kumar of Software Dioxide; and Vivek Kulkarni of B2K.

The staff and students of my two host institutions were most generous with their time and hospitality. The staff of the Socioeconomic and Environment Research Institute (SERI) of Penang was very helpful and welcoming. I would particularly like to thank Tan Pek Leng, the Director, for her support and guidance.

Similarly, the faculty and postgraduates of the Indian Institute of Information Technology – Bangalore were most kind. It was a true pleasure to spend time among such committed, approachable, and hospitable people. I will remember the sessions of tea, volleyball, and the occasional drink of Aristocrat with my friends there, particularly Ashish Chatterjee and Siddharta Chabra. Dr. Balaji Parthasarathy was of immense help with regard to theory and knowledge of the software industry. I would especially like to mention Dr. Vignesh Ilavarasan, whose conversations, advice, and exemplary collegiality were of immense help and inspiration. My survival on the dusty streets of Bangalore is entirely due to his street savvy and mastery of his Kawasaki motorcycle.

My fieldwork would not have been possible without the help and guidance of two genuine gentlemen who, due to their dedication and vision, have crafted ‘pockets of efficiency’ within their states. They are Dato’ Dr. Toh Kin Woon, Senior Minister of the Penang State Government and Professor S. Sadagopan, Director of the Indian Institute of Information Technology - Bangalore. Both provided generous institutional support, contacts, advice – and friendship. It was a privilege to know them.

Fieldwork and postgraduate study are not free ‘goods’, and assorted individuals, foundations, and governments made invaluable contributions to this scholastic endeavour. The Australian Government, through its HECS exemption for PhD courses, made this whole enterprise possible. I am also grateful to the Sir Roland Wilson Foundation, the Motor Trade Association of Australia, ANU’s Deputy Vice-Chancellor of Research, and the Indian Institute of Information Technology - Bangalore for their support. I would also like to thank Glenn Withers, Peter Larmour, Michael Hess and Roger Ley for the interesting and varied consultancies that they invited me to work on during my candidature. Lastly, I would like to thank Beatriz Hutchinson and Lorraine Salazar for their backing and support at crucial moments during this enterprise.
Canberra, while not over-burdened with leisure activities, does have some fine human beings who live there. At APSEG, I would to mention Jan Prowse and Michael Hess. I would also like to thank Peter Larmour, a fellow Sussex alumni, for his support, help, and friendship throughout my years there. A varied group of individuals from Burton and Garran, Graduate House, and the Sports Centre added spice to the otherwise unleavened existence of a postgraduate student. In particular, I would like to mention Arvin Appanah, Samuel Lesmond, Amy Chan, Yae Sano, Matthew Linley, Thomas Mettenmeyer, and Jaya Pillai.

In terms of academic guidance and supervision, Robyn Iredale and Prema-chandra Athukorala were very helpful during the early stages of my PhD. Harold Crouch generously read and commented on several chapters. Andrew MacIntyre provided much-appreciated academic and professional guidance. John Ravenhill gamely accepted to join my panel part-way into the thesis, providing much insightful guidance. Glenn Withers, my supervisor, imparted copious amounts of time, enlightenment, and exemplary advice – it is due to his theoretical ‘nudging’ throughout the PhD process that this thesis was completed.

With regards to my family, Emmanuel Salazar, Ian Hutchinson, and their families were always at hand for support and a welcome break away from work. Maria Hutchinson was a continual source of inspiration, laughter, reality checks, and encouragement from Canberra to Penang, Bangalore, and back. As I hand this in, she is receiving her third Masters’ degree, setting a fine example in scholarship for her younger brother. Beatriz C. Hutchinson provided unconditional support, love, and understanding, as the exemplary mother that she is and always has been. Knowing that I will always have a home to go to has kept me warm no matter where I may be. Muchas gracias por todo, mi campeona.

In addition to the learning that the PhD process instilled in me, it also gave me an exceptional blessing. From sharing innumerable cups of good coffee and red wine, theoretical ideas, feedback on chapters, travel expeditions, and now our wedding vows, Lorraine has been a continual source of fun, love, and now optimism for the future.

I dedicate this thesis to the wisest and most soft-spoken of gentlemen, Ian D. Hutchinson.
# Table of Contents

Declaration ........................................................................................................... ii
Abstract ............................................................................................................... iii
Acknowledgements .............................................................................................. iv
Table of Contents ................................................................................................. vi
List of Tables and Diagrams ................................................................................. ix
List of Appendices ................................................................................................. x
List of Abbreviations ............................................................................................. xi
Maps ...................................................................................................................... xiv

## Chapter 1 Introduction
Introduction ........................................................................................................ 1
The Research Question and Methodology ......................................................... 5
The Cases .......................................................................................................... 6
The Arguments ................................................................................................ 12
The Structure ................................................................................................... 15

## Chapter 2 Literature Review
Introduction ....................................................................................................... 17
Institutions and Economic Development ......................................................... 17
‘Developmental’ Institutions ......................................................................... 23
‘Developmental’ Policies ............................................................................... 36
Conclusions ..................................................................................................... 50

## Chapter 3 The Electronics Sector in Penang
Introduction ....................................................................................................... 52
The Electronics Sector ..................................................................................... 52
The Electronics Sector in Malaysia .................................................................. 61
The Electronics Sector in Penang .................................................................... 65
Challenges and Constraints ............................................................................ 71
Conclusions ..................................................................................................... 80
<table>
<thead>
<tr>
<th>Chapter 4 The Malaysian State and Industrial Policy Framework</th>
<th>82</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>82</td>
</tr>
<tr>
<td>Colonial Malaya</td>
<td>83</td>
</tr>
<tr>
<td>Post-Independence (1957-1969)</td>
<td>87</td>
</tr>
<tr>
<td>Increasing Malay Dominance (1969-1985)</td>
<td>92</td>
</tr>
<tr>
<td>Policy Realism (1985-2005)</td>
<td>105</td>
</tr>
<tr>
<td>Conclusions</td>
<td>128</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chapter 5 The Penang Case Study</th>
<th>131</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>131</td>
</tr>
<tr>
<td>Colonial Penang</td>
<td>132</td>
</tr>
<tr>
<td>Penang in the New Federation (1957-1969)</td>
<td>133</td>
</tr>
<tr>
<td>Laying the Foundation (1969-1980)</td>
<td>136</td>
</tr>
<tr>
<td>Maturity and Consolidation (1980-1990)</td>
<td>150</td>
</tr>
<tr>
<td>Obsolescence? (1990-2005)</td>
<td>166</td>
</tr>
<tr>
<td>Conclusions</td>
<td>199</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chapter 6 The Software Sector in Karnataka</th>
<th>202</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>202</td>
</tr>
<tr>
<td>The Software Sector</td>
<td>202</td>
</tr>
<tr>
<td>The Software Sector in India</td>
<td>212</td>
</tr>
<tr>
<td>The Software Sector in Karnataka</td>
<td>222</td>
</tr>
<tr>
<td>Challenges and Constraints</td>
<td>228</td>
</tr>
<tr>
<td>Conclusions</td>
<td>233</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chapter 7 The Indian State and Industrial Policy Framework</th>
<th>239</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>239</td>
</tr>
<tr>
<td>Colonial India</td>
<td>240</td>
</tr>
<tr>
<td>The Emerging State (1947-1964)</td>
<td>242</td>
</tr>
<tr>
<td>Deinstitutionalization (1964-1980)</td>
<td>253</td>
</tr>
<tr>
<td>Laying the Foundation (1980-1991)</td>
<td>265</td>
</tr>
<tr>
<td>Conclusions</td>
<td>289</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chapter 8 The Karnataka Case Study</th>
<th>286</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>286</td>
</tr>
<tr>
<td>Pre-Independence</td>
<td>287</td>
</tr>
<tr>
<td>Entrenched Conservatism (1947-1972)</td>
<td>288</td>
</tr>
<tr>
<td>Consensual Administration? (1972-1989)</td>
<td>292</td>
</tr>
<tr>
<td>Take-off (1989-1999)</td>
<td>300</td>
</tr>
<tr>
<td>Managing Success? (1999-2005)</td>
<td>316</td>
</tr>
<tr>
<td>Conclusions</td>
<td>342</td>
</tr>
<tr>
<td>Chapter 9 Conclusions</td>
<td>346</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-----</td>
</tr>
<tr>
<td>Introduction</td>
<td>346</td>
</tr>
<tr>
<td>The Theoretical Framework</td>
<td>346</td>
</tr>
<tr>
<td>The Sectors</td>
<td>347</td>
</tr>
<tr>
<td>Theoretical Implications</td>
<td>349</td>
</tr>
<tr>
<td>Policy Implications</td>
<td>356</td>
</tr>
<tr>
<td>Conclusion</td>
<td>363</td>
</tr>
</tbody>
</table>

| Appendices | 365 |

| Bibliography | 372 |
List of Tables and Diagrams

1. Diagram 2.1 – The National and Sub-national Developmental State Framework
2. Table 2.1 – The Relative Importance of Policies by Level of Governance
3. Diagram 2.2 – The Developmental State and Policy Framework
4. Diagram 3.1 – The Structure of the Electronics Sector
5. Diagram 3.2 – The Electronics Value Chain
6. Table 3.1 – Key Indicators for Malaysia’s Electronics and Electrical Industries
7. Diagram 3.3 – The Penang Electronics Sector
9. Table 4.1 – The Number of Public Enterprises in Malaysia (1965-1985)
12. Table 4.2 – Electronics Exports as a Percentage of Manufactured Exports (1968-2004)
15. Diagram 5.1 – Firms in PDC Industrial Areas (1970-1990)
17. Diagram 5.3 – Number of Firms in PDC Industrial Parks (1990-2002)
20. Diagram 6.1 – The Waterfall Model
21. Diagram 6.2 – Strategic Positions for Software Enterprises
22. Table 6.1 – Software Revenues and Exports (1990-2004)
24. Table 6.3 – Breakdown of the Indian Software Sector by Annual Turnover (2000-01)
26. Table 6.5 – Software Exports and Firm Headquarters by Region (2000-01)
27. Table 6.6 – Number of Firms and Software Exports Dispatched from Bangalore (1991-2005)
28. Table 6.7 – Firm Specializations in Bangalore (2002)
29. Table 6.8 – India’s Share of the Global Software Market (2001)
31. Table 7.1 – Selected Industrial Statistics (1964-1979)
32. Table 7.2 – The Number of Indian Software Firms (1981-1990)
34. Diagram 7.3 – GDP per capita (1960-2003)
37. Table 8.1 – Selected Economic Indicators for Karnataka (1993-1999)
List of Appendices

Appendix One – Research Methodology 365

Appendix Two – Alternative Theoretical Approaches 369
## List of Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCCIM</td>
<td>Associated Chinese Chambers of Commerce and Industry of Malaysia</td>
</tr>
<tr>
<td>ADB</td>
<td>Asian Development Bank</td>
</tr>
<tr>
<td>AICTE</td>
<td>All India Council on Technical Education</td>
</tr>
<tr>
<td>ASEAN</td>
<td>Association of Southeast Asian Nations</td>
</tr>
<tr>
<td>ASSOCHAM</td>
<td>Associated Chambers of Commerce and Industry</td>
</tr>
<tr>
<td>BATF</td>
<td>Bangalore Action Taskforce</td>
</tr>
<tr>
<td>BCIC</td>
<td>Bumiputera Commercial and Industrial Community</td>
</tr>
<tr>
<td>BDA</td>
<td>Bangalore Development Authority</td>
</tr>
<tr>
<td>BITES</td>
<td>Board for IT Education Standards</td>
</tr>
<tr>
<td>BJP</td>
<td>Bharatiya Janata Party</td>
</tr>
<tr>
<td>BN</td>
<td>Barisan Nasional</td>
</tr>
<tr>
<td>CEM</td>
<td>Contract Electronics Manufacturing</td>
</tr>
<tr>
<td>CEO</td>
<td>Chief Executive Officer</td>
</tr>
<tr>
<td>CIC</td>
<td>Capital Issues Committee</td>
</tr>
<tr>
<td>CII</td>
<td>Confederation of Indian Industries</td>
</tr>
<tr>
<td>CMM</td>
<td>Capability Maturity Model</td>
</tr>
<tr>
<td>CRRC</td>
<td>Collaborative Research and Resource Centre</td>
</tr>
<tr>
<td>DAP</td>
<td>Democratic Action Party</td>
</tr>
<tr>
<td>DoE</td>
<td>Department of Electronics</td>
</tr>
<tr>
<td>DoT</td>
<td>Department of Telecommunications</td>
</tr>
<tr>
<td>DS</td>
<td>Developmental State</td>
</tr>
<tr>
<td>EC</td>
<td>Electronics Committee</td>
</tr>
<tr>
<td>ECIL</td>
<td>Electronics Corporation of India Limited</td>
</tr>
<tr>
<td>EOI</td>
<td>Export-Oriented Industrialisation</td>
</tr>
<tr>
<td>EPU</td>
<td>Economic Planning Unit</td>
</tr>
<tr>
<td>EPZ</td>
<td>Export Processing Zone</td>
</tr>
<tr>
<td>ESC</td>
<td>Electronics and Software Export Promotion Council</td>
</tr>
<tr>
<td>FDI</td>
<td>Foreign Direct Investment</td>
</tr>
<tr>
<td>FERA</td>
<td>Foreign Exchange Regulation Act</td>
</tr>
<tr>
<td>FIC</td>
<td>Foreign Investment Committee</td>
</tr>
<tr>
<td>FICCI</td>
<td>Federation of Indian Chambers of Commerce and Industry</td>
</tr>
<tr>
<td>FKCCI</td>
<td>Federation of Karnataka Chamber of Commerce and Industry</td>
</tr>
<tr>
<td>FMM</td>
<td>Federation of Malaysian Manufacturers</td>
</tr>
<tr>
<td>FREPENCA</td>
<td>Free Industrial Zone, Penang, Companies’ Association</td>
</tr>
<tr>
<td>FTZ</td>
<td>Free Trade Zone</td>
</tr>
<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>GoI</td>
<td>Government of India</td>
</tr>
<tr>
<td>GoK</td>
<td>Government of Karnataka</td>
</tr>
<tr>
<td>GPN</td>
<td>Global Production Network</td>
</tr>
<tr>
<td>GRP</td>
<td>Gross Regional Product</td>
</tr>
<tr>
<td>HAL</td>
<td>Hindustan Aircraft Limited</td>
</tr>
<tr>
<td>HCL</td>
<td>Hindustan Computers Limited</td>
</tr>
<tr>
<td>HI</td>
<td>Historical Institutionalism</td>
</tr>
<tr>
<td>HICOM</td>
<td>Heavy Industries Corporation of Malaysia</td>
</tr>
<tr>
<td>HR</td>
<td>Human Resources</td>
</tr>
<tr>
<td>HRDC</td>
<td>Human Resource Development Corporation</td>
</tr>
<tr>
<td>IAS</td>
<td>Indian Administrative Service</td>
</tr>
<tr>
<td>Acronym</td>
<td>Full Form</td>
</tr>
<tr>
<td>---------</td>
<td>-----------</td>
</tr>
<tr>
<td>IBM</td>
<td>International Business Machines</td>
</tr>
<tr>
<td>ICA</td>
<td>Industrial Coordination Act</td>
</tr>
<tr>
<td>ICL</td>
<td>International Computers Limited</td>
</tr>
<tr>
<td>ICS</td>
<td>Indian Civil Service</td>
</tr>
<tr>
<td>ICT</td>
<td>Information and Communications Technology</td>
</tr>
<tr>
<td>IIM</td>
<td>Indian Institute of Management</td>
</tr>
<tr>
<td>IIM-B</td>
<td>Indian Institute of Management - Bangalore</td>
</tr>
<tr>
<td>IIT</td>
<td>Indian Institute of Technology</td>
</tr>
<tr>
<td>IIIT-B</td>
<td>Indian Institute of Information Technology – Bangalore</td>
</tr>
<tr>
<td>IMP</td>
<td>Industrial Master Plan</td>
</tr>
<tr>
<td>INC</td>
<td>Indian National Congress</td>
</tr>
<tr>
<td>IP</td>
<td>Intellectual Property</td>
</tr>
<tr>
<td>ISI</td>
<td>Import Substitution Industrialization</td>
</tr>
<tr>
<td>ISO</td>
<td>International Standards Organization</td>
</tr>
<tr>
<td>IT</td>
<td>Information Technology</td>
</tr>
<tr>
<td>ITES</td>
<td>Information Technology-Enabled Services</td>
</tr>
<tr>
<td>ITPL</td>
<td>International Technology Park Limited</td>
</tr>
<tr>
<td>JICA</td>
<td>Japan International Cooperation Agency</td>
</tr>
<tr>
<td>KBITS</td>
<td>Karnataka Biotechnology and Information Technology Services</td>
</tr>
<tr>
<td>KEONICS</td>
<td>Karnataka State Electronics Development Corporation Limited</td>
</tr>
<tr>
<td>KIADB</td>
<td>Karnataka Industrial Areas Development Board</td>
</tr>
<tr>
<td>KITVEN</td>
<td>Karnataka Information Technology Venture Capital Fund</td>
</tr>
<tr>
<td>KSDIT</td>
<td>Karnataka State Department of Information Technology</td>
</tr>
<tr>
<td>KUIDFC</td>
<td>Karnataka Urban Infrastructure Development Finance Corporation</td>
</tr>
<tr>
<td>KUM</td>
<td>Karnataka Udyog Mitra</td>
</tr>
<tr>
<td>LMW</td>
<td>Licensed Manufacturing Warehouse</td>
</tr>
<tr>
<td>MAIT</td>
<td>Manufacturers Association of Information Technology</td>
</tr>
<tr>
<td>MBA</td>
<td>Masters of Business Administration</td>
</tr>
<tr>
<td>MBC</td>
<td>Malaysian Business Council</td>
</tr>
<tr>
<td>MCA</td>
<td>Malaysian Chinese Association</td>
</tr>
<tr>
<td>MIC</td>
<td>Malaysian Indian Congress</td>
</tr>
<tr>
<td>MIDA</td>
<td>Malaysian Industrial Development Authority</td>
</tr>
<tr>
<td>MIDF</td>
<td>Malaysian Industrial Development Fund</td>
</tr>
<tr>
<td>MIEL</td>
<td>Malaysian Industrial Estates Ltd.</td>
</tr>
<tr>
<td>MIGHT</td>
<td>Malaysian Industry-Government Group for High Technology</td>
</tr>
<tr>
<td>MIMOS</td>
<td>Malaysian Institute of Microelectronic Systems</td>
</tr>
<tr>
<td>MITI</td>
<td>Ministry of Trade and Industry</td>
</tr>
<tr>
<td>MNC</td>
<td>Multinational Corporation</td>
</tr>
<tr>
<td>MPHB</td>
<td>Multi-purpose Holdings Berhad</td>
</tr>
<tr>
<td>MSC</td>
<td>Multimedia Super Corridor</td>
</tr>
<tr>
<td>MTDC</td>
<td>Malaysian Technology Development Corporation</td>
</tr>
<tr>
<td>NASSCOM</td>
<td>National Association of Software and Service Companies</td>
</tr>
<tr>
<td>NDA</td>
<td>National Democratic Alliance</td>
</tr>
<tr>
<td>NDP</td>
<td>New Development Plan</td>
</tr>
<tr>
<td>NEP</td>
<td>New Economic Policy</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-governmental Organization</td>
</tr>
</tbody>
</table>
NIC  Newly Industrialized Country
NIE  New Institutional Economics
NIS  National Innovation System
NPC  National Productivity Corporation
NRI  Non-Resident Indian
ODC  Offshore Development Centre
OECD  Organization for Economic Cooperation and Development
OPM  Office of the Prime Minister
PAS  Parti Islam Se Malaysia
PC  Planning Commission
PCCC  Penang Chinese Chamber of Commerce
PDC  Penang Development Corporation
PECO  Penang Competitiveness Committee
PERDA  Penang Regional Development Authority
PIA  Promotion of Investment Act
PMO  Prime Minister’s Office
PPC  Penang Photonics Consortium
PSDC  Penang Skills Development Corporation
PSDP  Penang Strategic Development Plan
PSDP2  Second Penang Strategic Development Plan
PSG  Penang State Government
RM  Ringgit Malaysia
R&D  Research and Development
SCoPE  Software Consortium of Penang
SEDC  State Economic Development Corporation
SERI  Socioeconomic and Environmental Research Institute
SID  Society for Innovation and Development
SIRIM  Standards and Industrial Research Institute of Malaysia
SME  Small and Medium Enterprise
SMI  Small and Medium Industries
SMIDEC  Small and Medium Industry Development Corporation
SOE  State Owned Enterprise
SPIN  Software Process Improvement Network
STPI  Software Technology Parks of India
STPI-B  Software Technology Parks of India, Bangalore Office
TDICI  Technical Development and Investment Corporation of India
TI  Texas Instruments
TiE  The Indus Entrepreneurs
TTA  Technology Transfer Agreement
UDP  United Democratic Party
UMNO  United Malays’ National Organisation
UNCTAD  United Nations Commission on Trade and Development
UNDP  United Nations Development Programme
UPEN  State Economic Planning Unit
USM  Universiti Sains Malaysia
VC  Venture Capital
WTO  World Trade Organization

xiii
CHAPTER 1

*Can Sub-national States be 'Developmental'?*

*The Cases of Penang and Karnataka*

**Introduction**

When electronics manufacturers go to Malaysia, they do not stop in the national capital, Kuala Lumpur, but fly directly to production sites in a distant province, Penang. This small state, near the border with Thailand, has established a reputation as a dynamic hub for technology-intensive goods such as semiconductors and hard disk drives. Similarly, while a Fortune 500 company may outsource its software needs to a firm in New Delhi, it is more likely to enlist the services of a company in a southern Indian state like Karnataka or Andhra Pradesh, whose software sectors are known for their innovation and aggressiveness.

Far away from capital cities, sub-national regions in countries like Malaysia, India, the Philippines, and China have created environments that seem different, and slightly separate, from the rest of the country. Investors here do not liaise with the central government, but rather provincial government agencies for necessary incentives, permits, and licenses. They source components, design work, or labour from a variety of dynamic firms nearby, and send their goods from local airports or via the internet.

The theory of comparative advantage argues that ‘patterns of location, specialization, and trade will be driven by the geographical distribution of factors of production’ (Storper 2002:242). However, until recently, these regions were characterized by scarce capital, and abundant land and labour. Thus, it is pertinent to ask how these regions altered their comparative advantage away from hosting simple, labour-intensive tasks towards more complex, capital-intensive ones.
Research carried out on countries that have successfully ‘upgraded’ their comparative advantage, such as Japan, Korea, and Taiwan, suggests that part of their success lies in their institutional contexts. In particular, ‘developmental’ state agencies fostered the transformation of their economies through effective, proactive policymaking and close ties with the private sector.

However, unlike their counterparts in countries with effective states, firms in many countries with less capable states have not benefited from the same enabling policymaking. Rather, these location-specific industries have emerged in national contexts that were not particularly conducive to rapid economic transformation. Thus, it is worth asking whether these economies’ local institutional contexts aided their industries to develop more quickly.

Bringing such institutional analyses down to the local level is timely, as economic and political activity is becoming increasingly location-specific. On one hand, information and communications technology (ICT) is reconfiguring the geography of production, fostering the agglomeration — or clustering — of many capital-intensive industries such as international finance, electronics, and software. On the other, many national-level states have begun to decentralize or devolve resources and responsibilities to lower levels of government, either through a generalized ‘rolling back’ of the state or conscious decentralization measures.

Developmental States and Economic Transformation

A considerable body of work has looked at the role of the state in promoting economic development. Much of this scholarship, coming from a comparative politics perspective, prioritises the role of a country’s institutions in fostering and guiding economic transformation. The goal of this line of inquiry is not simply to transfer institutional blueprints or policies from one country to another, but rather to ask how these countries’ political and institutional conditions enabled the emergence and growth of specific industries and sectors.
This work builds on Johnson's (1982) pioneering research, which persuasively argued that Japan's extraordinary growth was due to intervention by the country's 'Developmental State'. In analysing the state's bureaucratic capacity and productive ties to local business elites, Johnson showed how the country's institutional configuration influenced its subsequent economic growth. Thus, his work moved the debate away from dichotomising the state and market towards seeking to understand how different institutions, and their interaction, enable or constrain economic development.

Subsequent work has analysed a variety of East Asian and European countries, showing how their states and business elites have laid the foundations for successful economic development. It has also been applied to 'intermediate' states that do not enjoy the same levels of bureaucratic capacity as the East Asian newly industrialized countries (NICs).

In general, the Developmental State literature emphasizes three institutional characteristics necessary for promoting economic transformation. These characteristics, which this thesis will use as an operational definition, are: a comparatively autonomous and capable bureaucracy; an over-riding commitment to economic growth; and a high degree of public-private cooperation (Onis 1991:120).

Similarly, this thesis will define successful economic transformation as one of two outcomes: engineering a transition from an economy based on agriculture to one based on industries or services, termed structural transformation; or creating new production activities, speeding up technological learning, and disseminating innovative practices within a specific sector, termed sectoral or industrial-technological transformation (Weiss 1998:66).

**Sub-national Developmental States?**

To date, the Developmental State literature has largely retained its focus on the national level. While this framework is useful for establishing whether and how national-level institutions fostered a specific industry, it is less useful for understanding why an industry developed in one part of a country and not another.
This may not be so relevant in countries with a high concentration of economic activity in one city. However, even in these cases, differing levels of bureaucratic capacity throughout the national territory may privilege the emergence and trajectory of an industry in one location over another. As Gills and Philip state ‘even within the same country, i.e. at the sub-national scale, local and regional differentiation can produce differential outcomes of economic policy pursued nationally.’ (1996:586)

This question becomes more pertinent in countries, usually with federal structures, that have sub-national states that compete against each other for investment and government resources. While the overall policy context is set by the central government, provincial governments may have formal and informal responsibilities that permit them to play a pivotal role in their region’s economic development. As these government institutions are, in theory, closer to their constituents, they may also be better placed to deliver particular types of services (Abelson 2003:345).

Furthermore, many of the changes associated with globalization entail an increasingly important role for sub-national levels of government. During the 1980s and 1990s, many countries liberalized their economies and decentralized tributary and service-delivery responsibilities, leaving room for greater participation by lower levels of government (Snyder 2001:94). In addition, the tendency of skill-intensive industries to ‘cluster’ in specific regions to benefit from external economies requires greater attention to location-specific needs, something sub-national governments may be better placed to do (Gray and Dunning 2002:413).

Economic geography looks at the role of sub-national state institutions in fostering economic development (Saxenian 1994, Scott 1996, Storper 1997). This approach is particularly useful for this thesis, as it looks at local institutions and how they can support economic development through minimizing information asymmetries, overcoming collective action failures, and maximizing positive externalities.

---

1 A ‘region’ is ‘any sub-national level of spatial organization with significant internal economic polarization’ (Scott 2002:155). Note, therefore, that a province or sub-national unit may contain more than one economic ‘region’.
However, this work focuses only on the local level at the expense of national-level analysis (Martin 2000:89). Thus, this literature is less able to judge how industrial success in a particular location is specifically the result of sub-national institutions and their policies. Given that national-level state institutions are more likely to define the overall context within which local institutions operate, this is an important omission. Furthermore, responsibilities are often overlapping and contested, entailing an important political dimension that must be explored.

Therefore, this thesis argues that attempts to understand how institutional configurations affect and shape economic development at the local or regional level must analyse both national and sub-national institutions and the interplay between them.

The Research Question and Methodology

The question, then, that this thesis asks is ‘Can sub-national states play an influential role in promoting economic transformation?’

To this end, using two dynamic regional economies as cases, this thesis will seek to establish how sub-national state institutions, within the parameters set out by national state institutions, can shape and influence the trajectory of particular industries.

The issues that this thesis looks at, and the methodology that it uses, fall within the realm of comparative politics. This discipline aims to ‘pursue theoretically informed empirical political analysis, focusing on one or more countries, through diverse conceptual lenses and utilizing a variety of data, contemporary or historical, qualitative or quantitative’ (Kohli et al. 1996:2-3).

While this thesis will be looking at political systems in two different countries, seeking to highlight similarities and differences between the cases, it will also bring on board theoretical elements from economic geography as it has better tools with which to understand the spatial dimension of economic activity.
Due to the limited number of cases involved, this thesis will not seek to formulate a hypothesis that can then be generalized. Rather, through studying two cases in depth, its aim is to shed light on topics of interest such as state structures at the national and sub-national levels, the relationship between the public and private sectors, different types of state policy, and what these imply for economic transformation.

The Cases

Probably the most successful emerging regional economies are to be found in the East Asian NICs. For electronics, Singapore is the most obvious case as are Taipei2 in Taiwan and the Seoul-Inchon region3 in Korea (Posadas 2005:12, Scott 1998:128). Regarding software, successful cases would include Tel Aviv in Israel and Dublin in Ireland (Heeks and Nicholson 2004:271).

However, care needs to be exercised in choosing cases for study that allow the institutional determinants of economic transformation, and in particular the role played by sub-national states, to be explored.

In the case of Taiwan, Korea, Israel, and Ireland, these industries are concentrated in their capital cities, making it hard to determine how much central, as opposed to sub-national institutions and policies, are responsible for shaping these industries. This is even more relevant for Singapore that, as a city-state, has no intermediate levels of government. Secondly, these countries have successfully industrialized and display formidable developmental capacities.4 Thus, the causality behind a particular region’s success will be hard to separate from the country’s overall high levels of state capacity.

---

2 Most of the electronics industry is housed in the Hsinchu High-technology Park, which is the ‘heart of Taiwan’s technology industry, boasting 221 companies with 60,400 employees and revenues of some US$ 12 billion’ (Posadas 2005:12).
3 This region alone accounts for almost 50 per cent of the country’s manufacturing employment (Scott 1998:128).
4 The East Asian developmental states will be discussed in Chapter Two. For Israel and Ireland, see O’Riain (2000) who terms them ‘flexible’ developmental states.
Thus, for the purposes of this exercise, it is important to choose successful regional economies that are not capital cities and are in countries that have similar multi-level governmental structures – ideally federal structures with a central unit and sub-national counterparts. In addition, it is fruitful to select cases in countries whose national states are not developmental, but rather have more modest or ‘intermediate’ capabilities.

Following this logic, this thesis will focus on Penang, Malaysia and Karnataka, India. These provinces have established reputations as dynamic production centres in the electronics and software sectors, respectively. While they specialise in different industries, they possess the following institutional characteristics central to this exercise: they are in countries whose national states possess intermediate capacities for fostering economic transformation; they are not located in or near national capitals; and they are in federal systems whose state governments have some leeway for fostering economic development.

The Sectors

The electronics and software industries have significant differences, but also display many similarities. They have a similar international division of labour, with tasks such as design, research and development traditionally concentrated in industrialised countries and the more labour-intensive tasks located in developing countries. In both cases, industry leaders from developing countries are beginning to emerge, gradually taking on more sophisticated tasks and establishing leading-edge capabilities in particular niche markets⁵ (Yusuf 2004:4, Heeks and Nicholson 2004:267).

Both Penang and Karnataka began their careers at the labour-intensive end of their respective industries. Since then, they have been trying to specialize in more value-added tasks in line with their increasing capabilities. Most importantly, both states have emerged head and shoulders above other competing regions – signalling possibly unique institutional or industry dynamics.

⁵ While they differ, comparisons of these sectors’ skill, infrastructure and market requirements are important insofar as they enable the quality of government interventions to meet these needs to be evaluated.
Penang is Malaysia’s undisputed electronics industry leader, successfully outstripping competing states like Selangor/Kuala Lumpur and Johor, near Singapore. The region’s electronics sector is comprised of some 700-800 firms and employs 85,000 people clustered in the capital city, Georgetown, and a series of nearby industrial parks (JICA 2001:7.10, PDC website6).

While all three states employ similar numbers of workers, Penang hosts a core of leading electronics MNCs such as Intel, Motorola, and Agilent. Furthermore, observers agree that Penang-based firms perform more complex tasks, engage in more technological learning, and have a more sophisticated inter-firm division of labour. A group of local firms has evolved in line with the industry’s increasing technological sophistication and they are now MNCs themselves, setting up facilities in China, Indonesia, and the Philippines (Narayanan 1999:60, Best and Rasiah 2003:40).

That said, Penang’s electronics sector is not without its challenges. Some argue that it is stuck in a ‘medium-technology’ trap, faced with competition for high-end tasks from Singapore and increasing rivalry for labour-intensive tasks from China and Vietnam (JICA 2001:2.27).

Karnataka’s software sector is somewhat bigger, comprising some 1,500 software companies that employ approximately 160,000 people and are concentrated in its capital city, Bangalore. It also hosts the industry’s leading MNCs such as IBM, Texas Instruments, and Hewlett Packard, as well as India’s premier domestic firms like Infosys Technologies, Satyam, and Wipro.

As with Penang, Karnataka has moved ahead of competing states such as Andhra Pradesh, Maharashtra, West Bengal, and New Delhi to emerge as the industry leader. At present, Bangalore hosts the most headquarters of the top 700 Indian software companies and produced some US$ 6.3 billion in exports in 2004-05 (Lema and Hesbjerg 2003:59,92, KSDIT website7).

Karnataka currently faces competition from Israel and Ireland for more sophisticated tasks like product development, and from Russia, China, and the Philippines for more low-end tasks like coding and testing. However, because of India’s size and massive reserves of labour, the fiercest competition comes from other provinces in the country, who seek to lure Bangalore-based firms with promises of stocks of trained workers and better incentives and infrastructure.

National Institutions

Evidently, Malaysia and India have very different income levels and population bases. The first country is upper-middle income and has a population of some 25 million, compared to the second’s low-income status and population of one billion. However, the two countries also display many important similarities. They share a similar colonial experience, which began and ended at roughly the same time. Independence was granted in a relatively orderly fashion, meaning that many colonial institutions – including language – were maintained, influencing subsequent political, institutional, and economic developments. The structure of Malaysia’s and India’s economies was also fundamentally shaped by British policies, meaning that they both confronted a range of similar issues after independence. And, both countries are multi-ethnic, which in turn dramatically shaped their development.

As regards Malaysia, although its state has been characterized as ‘strong’ or authoritarian, its membership among the ranks of Developmental States is questionable. Some classify it as an ‘intermediate’ state that – along with Indonesia and Thailand – has been quite successful at fostering economic growth, but less effective at engineering economic transformation (Doner et al. 2005:327). Scholars attribute this to commitments to the inter-ethnic distribution of wealth above economic transformation as well as pervasive rent-seeking (Ritchie 2005:745, Gomez and Jomo 1999:25).

While of help in understanding Malaysia’s middling success at spawning indigenous high-tech industries, this argument is of only limited utility in explaining why and how Penang has emerged as a dynamic centre for electronics production.
India, for its part, has been called a ‘failed’ Developmental State by some (Herring 1999:306) and an ‘intermediate’ state by others (Evans 1995:13). Once an exemplar of bureaucratic capacity, the Indian state lapsed into rent-seeking. Efforts to spur industrialization were hampered by excessive regulation, inefficient public sector enterprises, and inadequate incentives for the private sector. Furthermore, India’s immense social complexity and plethora of interest groups also prevented the single-minded pursuit of economic transformation.

Work by Evans (1995), Pingle (2000), Parthasarathy (2000), and Chibber (2003) has nuanced this analysis, looking inside the state apparatus to understand how different agencies interacted with each other, and how ‘pockets of efficiency’ had catalyzing effects for specific sectors, such as software.

Again, this work is of immense value in explaining how the Indian state was able to foster a local software industry. As with Penang, however, it is of less use in explaining why the state of Karnataka has emerged as an international software production centre. The greater technical sophistication of firms and higher number of multinational corporation affiliates, particularly research and development facilities, suggests that Karnataka has a unique set of attributes, some of which may be found in its local institutional context.

**Sub-national Institutions**

Due to their colonial legacies and multi-ethnic composition, Malaysia and India have a similar governmental structure, comprised of a federal or central government and a collection of state governments. The responsibilities of each level of government are set out in the countries’ constitutions, with separate lists for unique responsibilities and a concurrent list for shared responsibilities. In both cases, state elections are held much in the

---

8 For the purposes of this thesis, ‘state’ and ‘provincial’ governments are coterminous, and are distinct from ‘local’ governments.
same mould as national elections. Thus, state-level institutions are the logical place to begin the inquiry. ⁹

However, while the framework governing the relationship between the national government and state governments is similar, the responsibilities of state governments differ in each country. Furthermore, the characteristics of the two provinces in question, Penang and Karnataka, are markedly distinct.

In Malaysia, state governments have very limited powers, which are essentially restricted to land management and religious affairs. Their fiscal autonomy is almost non-existent as they are reliant on grants and transfers from the federal government. In contrast, responsibilities relating to education, industrial policy, and large-scale infrastructure all lie with the federal government.

Although it is among the smallest of the country’s 14 states and has a population of 1.4 million, the Penang State Government (PSG) has a reputation as the most professional and proactive state government in the country. Despite this, little research has been done to examine how the PSG influenced the development of its electronics sector.

To date, work on Penang has concentrated on the capabilities and interaction of firms in the electronics sector (Best and Rasiah 2003, Rasiah 2001, Narayanan 1999) and only occasionally touched upon the role of policies implemented by the Penang State Government (Churchill 1995, Rasiah 1999a). In addition, more comprehensive policy-oriented work such as Haggard et al. (1998) was carried out before Penang was hit by a downturn in the electronics industry and the emergence of formidable low-cost competitors – which have sorely tested its ‘developmental’ aspirations.

As regards India, the 29 state governments are given a much wider scope of responsibilities. State governments are tasked with agriculture, pre-university education,

⁹ Malaysia and India also have local governments, but in both cases, state governments have absorbed many responsibilities formerly attributed to locally elected bodies (Ruland 1992:210, Thimmiah 2000:3). Furthermore, while state governments may be charged with responsibilities such as health, education, or infrastructure, local governments in both countries are more oriented to the delivery of services such as waste collection and maintenance – which are of less direct relevance to economic development.
and infrastructure. They also have joint responsibility, along with the central government, for higher education and economic and social planning (Thimmaiah 2000:6). Liberalization after 1991 has seen greater competition between states to attract investment and resources both from the central government and international investors.

Karnataka is a mid-sized Indian state, with a population of some 50 million people and a capital city, Bangalore, with 6 million people. In addition to being a centre for the software industry, Karnataka also has sizeable textile, mining, and coffee sectors. It also has a very large and mobilized rural electorate that is increasingly making itself felt. Despite this, the Government of Karnataka has established a reputation for progressive and IT-friendly policies. The province also has an entrepreneurial business community that is articulate and aggressive, and has spawned the most dynamic local companies.

Notwithstanding this reputation, little attention has been paid to how the Government of Karnataka has contributed to the software sector’s emergence and development. As with Penang, work on Karnataka’s software sector centres on firm capabilities and interaction (Saxenian 2002, Upadhya 2003, Lema 2005). As regards policy-oriented work, Parthasarathy (2000, 2004) looks at how central government policy influenced the software sector in Bangalore, but does not look specifically at the Government of Karnataka’s role.

The Arguments

Therefore, through bringing together a wide range of primary material, including policy documents and extensive key informant interviews, this thesis will show how these provinces’ histories, institutional arrangements, and policy regimes influenced their potential for economic transformation. In the process, this thesis will make several new and inter-related arguments regarding the Penang and Karnataka sub-national states, and contribute to the academic debate on institutions and economic transformation in various ways.

10 For further information regarding the fieldwork undertaken for this thesis, please consult Appendix One.
First, despite very limited responsibilities and resources, this thesis will argue that the Penang State Government closely resembled the ideal type of a sub-national Developmental State for two decades. The state government, through a highly capable pilot agency, successfully articulated a long-term vision for economic transformation and marshalled all available resources to its pursuit. It established ties with both the international and local private sectors, and fed the results of this communication into its policies, thus enabling effective implementation. In addition, due to a series of entrepreneurial activities, the state government was able to circumvent its resource constraints and effectively provide public goods as well as implementing a variety of market-complementing policies to foster rapid industrial growth. Decreasing autonomy from federal government interference gradually led to the eclipse of Penang’s state-led development model.

In contrast, the Government of Karnataka, despite being the epitome of a sub-national Developmental State during colonial times, rapidly lost its bureaucratic capacity after independence. This, coupled with the province’s plethora of interest groups, militated against decisive state action to foster economic transformation. Rather, the success of the province’s software sector was due to serendipity, agglomeration effects, and timely intervention by one central government agency. The Government of Karnataka’s main supporting measures came once the software sector was established and able to pressure the provincial government for resources and investment.

In making these arguments, this thesis makes a contribution to the academic debate on institutions and economic transformation in four areas.

First, this thesis shows that the Developmental State framework can be extended downwards to the sub-national level. The Penang case study shows that the state government more closely resembled the ideal type of a Developmental State, in both institutional and policy terms, than many national counterparts – including the Malaysian state.

In ‘uncovering’ a successful sub-national Developmental State, this thesis proves that the fate of a given regional economy need not be exclusively determined by the capacities and
Priorities of its national-level counterpart. While national states can, and do, profoundly affect the context within which provincial states carry out their duties, there is room for agency at the sub-national level.

Second, this thesis contributes to our understanding of the institutional characteristics that underpin successful state performance at the sub-national level. The embryonic literature on sub-national Developmental States has, to date, compared two or more provinces within the same country (Remick 2002, Sinha 2004, 2005). This thesis, in comparing provincial governments in two countries that possess a similar federal government framework, is able to reveal more information on how structural and contextual factors affect the ability of sub-national governments to productively influence their economic fortunes. In particular, this exercise shows that while sub-national states can and do promote economic transformation, there is no single pattern in the way they do this.

The cross-country comparison shows that bureaucratic capacity, the prioritization of economic transformation, and good communication with the private sector are fundamental. However, the case studies also highlight three other conditions that underpin effective performance at the sub-national level. They are: sufficient autonomy from national state directives; economic 'vulnerability' due to intra-provincial competition or hostile national-level policies; and broad-based, as opposed to intra-elite, political support for economic transformation. In addition, the case studies show that institutions evolve over time, affecting the capacity of states to promote economic transformation.

Third, this thesis contributes to knowledge regarding how location-specific and technology-intensive industries can be fostered. The case studies show that the policies needed to start a regional economy are different from those needed to make it grow. Both sub-national states attempted to woo investors through investment promotion, high-quality infrastructure, and targeted provision of skilled workers. While this policy framework was successful in attracting investment, it was not sufficient to enable each region's respective industry to acquire more sophisticated and unique capabilities. These capabilities require more long-term and gradual policy interventions that appeared beyond the capability of either sub-national state, despite their greater proximity to local market actors than their national-level counterparts. While the Penang State Government was a catalyst for the electronics
industry, after it was established the state government was unable to perceive and adapt to the industry’s evolving needs. The Government of Karnataka, for its part, was aware of its limited capacities and was content to let the private sector lead the way.

Fourth, this thesis demonstrates that there is a spatial dimension to economic activity. The institutional context of a specific location can have a determinant effect on how a specific industry develops. Whether due to serendipity or conscious policy choices, this thesis shows how Penang and Karnataka’s institutions shaped their economic development, enabling them to pull ahead of other competing provinces.

Beyond political economy issues, technological changes, economic crises, business cycles, and external shocks also play a part in influencing a country’s drive towards economic transformation. However, this thesis focuses on political and institutional factors at the national and sub-national levels, which it argues are central – though not necessarily the only – variables at work.

The Structure

The next chapter will review the relevant literature and set out the theoretical framework that will be used in subsequent chapters. The discussion will look at institutions and how they influence economic activity. This will then be related to work on states, private sector organizations, and economic development. Following this, institutions and their ramifications for the spatial distribution of economic activity will be analysed, in order to subsequently extend the framework of analysis to the sub-national level. Last, the policy options available to national and sub-national states will be set out.

From there, the thesis will then proceed to the cases, dealing first with Penang and, subsequently, Karnataka. Each case will be comprised of three chapters, which will be structured in an identical fashion.

The first chapter will analyse each region’s economic development, paying particular attention to the sector in question – namely electronics or software. The discussion will
seek to establish how each sector has developed, its current status, and its relative success vis-à-vis national and international competitors.

The second chapter will adopt a traditional comparative politics approach to assess each country’s national-level institutions, analysing how institutional factors such as state structure, bureaucratic capacity, and composition of the private sector have shaped the country’s economic trajectory. In addition, the utility of different policy frameworks will be assessed. Due to this thesis’ emphasis on institutions, there is a need for significant historical information, often dating before the emergence of the sector in question. In order to provide this, the chapter will draw extensively on secondary sources to lay out the necessary background.

The third chapter will analyse the sub-national region in question, namely Penang and Karnataka, seeking to understand how and whether local-level institutions and policies have played a role in the emergence and subsequent development of each region’s economy. Attention will also be paid to the interaction between institutions at the national and sub-national levels, seeking to understand how they influence each other and what impact this has on the industry in question. This chapter will constitute the case studies, seeking to bring together data from a wide range of primary sources in order to analyse the role of the sub-national government in question.

In the concluding chapter, the thesis will bring out the theoretical and policy implications gleaned from the two cases. While case studies are limited insofar as generalizations are concerned, one can draw insights from the way institutions in these cases influence economic activity that may have relevance elsewhere.

11 For example, Kohli in his review of Korea, Brazil, India, and Nigeria argues for a ‘historical orientation, because the core character of these states was often acquired long before they started intervening in the economy to promote development’ (2004:8).
CHAPTER 2

Literature Review

Introduction

The previous chapter posited that a specific location’s institutions can shape, enable, or constrain economic activity and, thus, different economic outcomes in different parts of a country can be a result of their specific institutional contexts. This chapter will elaborate on this argument through reviewing the relevant theoretical literature and setting out an analytical framework to evaluate the case studies. In addition, through this discussion, the chapter will also locate this thesis within a larger body of work, specifying how the questions being asked relate to, and build on, existing scholarship.

To this end, the chapter has four parts. The first sets out how institutions will be defined and approached. The second analyses how different institutional configurations can promote economic transformation. The third assesses how different policies can be beneficial for economic transformation through addressing key market failures or making deeper, structural interventions. The fourth and final section puts forward the chapter’s principal conclusions.

Institutions and Economic Development

A good deal of economics research, principally of a Neoclassical orientation, has based itself on the assumption that markets work ‘perfectly’. This means that there is freely available information about goods and services, actors are reliable, and there are no enforcement problems.

However, it is increasingly recognized that these assumptions only hold for a very limited range of circumstances. Most market transactions depend on a range of institutions to
function properly, such as a regulatory framework, well-established property rights, and mechanisms of conflict resolution (North 1981:5).

In addition, the unexpected effects of liberalization and privatization in Russia, the high social cost of market reforms in Latin America, and the financial crisis in East Asia have highlighted the role institutions can also play in enabling economic activity and attempts to institute reform (Rodrik 2000:4).

As a result, organizations such as the World Bank have begun to argue that 'institutions matter', stating that the quality of a country's bureaucracy, law and order, property rights, and anti-corruption measures need to be developed or strengthened for successful economic performance (Burki and Perry 1998:15-17).

Thus, institutions are increasingly being recognized as an important part of the 'landscape' that underlies, shapes, and influences the emergence and development of economic activity. However, the debate about how institutions influence economic activity, which institutions are necessary, and how they can be developed is ongoing.

The Approach to Institutions

There are a variety of ways of approaching institutions. Perhaps the most well known is New Institutional Economics (NIE), pioneered by North and Williamson. The NIE School highlighted the centrality of institutions to well-functioning markets, arguing that 'competitive' markets do not always yield optimal outcomes. For example, individuals pursuing their self-interest may make decisions that are collectively suboptimal, or restricted flows of information may elevate transaction costs. Thus, they argue that individuals create institutions, or rules, to minimize such inefficiencies. The NIE School defines these institutions as 'the humanly devised constraints that shape human interaction' which 'reduce uncertainty by providing a structure to everyday life'. Once institutions are established, they set boundaries, or constraints, on further action (North 1990:3-5).
According to the NIB School, a given location’s institutional context or ‘regime’ can be further divided into its ‘institutional environment’ and ‘institutional arrangements’. The institutional environment refers to informal conventions (such as consumption habits, work practices, or traditional business practices) and formal rules and laws (such as trading and employment regulations). Institutional arrangements encompass ‘organizational forms’ such as firms, government agencies, and markets. Institutional arrangements emerge and are shaped by the institutional environment; however, in turn, they can and do modify the institutional environment over time (Martin 2000:79-80).

NIB has influenced other disciplines such as economic geography and political science, particularly through Rational Choice Institutionalism. According to Dininio ‘using basic insights from economics, rational choice institutionalism examines the way institutions structure an individual’s calculations in engaging in socially optimal or suboptimal behaviour’ (2002:3-4). This line of inquiry stresses concepts such as transaction costs, rent-seeking, property rights, principal-agent models and collective-action dilemmas in understanding the functioning and evolution of institutions (Hall and Taylor 1996:6).

**Historical Institutionalism**

The Historical Institutionalist (HI) conceptualisation of institutions is largely consistent with the Rational Choice approach, but seeks to extend it, arguing that an individual’s motivations cannot be reduced to an a-historically determined material self-interest. Rather, in addition to shaping an actor’s strategies for maximising their self-interest, the institutional context (through norms and customs) also shapes what these goals are. This difference shifts the focus of analysis away from the individual acting within a given institutional context to the institutions themselves, as institutions influence the goals and preferences of decision-makers and also distribute power among them, thus influencing political processes and how institutions are chosen and/or evolve (Koelble 1995:236).¹

¹ This approach is largely consistent with Chang’s Institutional Political Economy. See Chang and Evans (2000) and Chang (2001).
The Historical Institutionalist perspective is well-suited to analysing the evolution of institutions and policymaking, as ‘it focuses on the impact of political struggles on institutional outcomes and the way institutional outcomes in turn shape further rounds of political struggles over policy and institutional rules’ (Koelble 1995:242). This approach has been used by academics to analyse ‘intermediate-level’ institutions such as party structures, bureaucracies, and business groups to understand how they affect political outcomes in different contexts (Thelen and Steinmo 1992:6).

Therefore, this thesis will adopt a Historical Institutionalist perspective, due to its suitability for contrasting experiences between countries and teasing out similarities and differences in institutional configurations or policies.²

The State and Market as Institutions

Following Weber, Skocpol defines states as ‘compulsory associations claiming control over territories and the people within them’. Skocpol posits that the state is comprised of a series of organizations, or institutions, that perform ‘administrative, legal, extractive, and coercive’ tasks, through which ‘official collectivities may pursue distinct goals’. These organizations are structured differently across countries and have varying levels of capacity which, in turn, affect the ability of the state to achieve its aims (1985:7,28).

Following the definition of institutions set out above, namely that they are the ‘rules of the game’ that constrain and incentivise action, the market itself can be seen as an array of institutions that regulate and decide what goods and services can be traded, who can trade, how trade should be carried out, and to what extent prices can vary (Chang 1998:67).

This leads to several conclusions. The first is that many aspects regarding the working of the ‘free’ market can be, and are, politically contested (Chang 2001:6). The second is that markets depend on, and are affected by, a variety of non-market institutions. Rodrik mentions: property rights; regulatory institutions; as well as institutions for macroeconomic

---

² However, it is important to state that the Historical Institutional perspective is not so well-suited to analysing the influence of ideas or leadership on political outcomes. For a more expanded discussion of these criticisms and their rebuttals, please see Grindle (1999:16-17).
stabilization, social insurance, and conflict management (2000:6). Other more informal institutions such as corporate codes of conduct, traditions of government-private sector interactions, or social conventions can also affect overall market performance.

Viewing the market in this way, as opposed to a 'naturally-occurring' phenomenon ruled by its internal logic, leads to a re-conceptualisation of its relationship with other institutions. This contradicts the 'market primacy' assumption, which posits that markets existed first, and the state and other institutions were developed afterwards to correct market failures and provide public goods (Chang 2003:90).

This argument is particularly relevant for developing countries, where there can be many vested interests that oppose the breaking up of monopolies and monopsonies necessary for establishing a competitive market. Furthermore, once a market is set up, it requires continual supervision and regulation, as leaving it to work in an unsupervised manner will most likely not result in a competitive market but, rather, one characterised by collusion and cartels (Chaudhry 1993:251).

Chang takes this further, arguing that a range of institutions beyond the state and market are important for economic development, and both states and markets need to be adequately supported by these institutions in order to function well. In this light, focusing exclusively on the merits of the market or the state without seeking to develop the necessary institutional bases for them to function adequately is not constructive (1998:10). Therefore, Chang proposes analysing:

1) The institutions that comprise the market (trading rules and property rights) and state (the bureaucracy).

2) Institutions outside both the market and state that coordinate and administrate (business associations, public-private consultation bodies).

3) The interaction between these different institutions. (1998:69)

This framework is open-ended, prioritising the productive interaction between institutions, rather than a specific configuration per se.
Institutions, Location, and Economic Activity

Just as the Historical Institutionalist perspective is of utility in understanding how institutions shape political processes and policymaking, it is also of use in clarifying how they generate geographically uneven patterns of economic development. Many economic geographers hold that economic activity is shaped by institutional structures, arguing that institutional environments and arrangements can differ markedly between regions, with differing effects on the level of production (Storper and Scott 1995:509).

Institutionalist economic geographers argue that the forces of economic development generate spatially differentiated outcomes in terms of growth, prosperity, and employment. Those forces in turn both forge and are forged by a complex matrix of institutions... The implicit assumption is that although institutions are unlikely to be the sole “cause” of geographically uneven development, they enable, constrain, and refract economic development in spatially differentiated ways. An institutional approach to economic geography...seeks to uncover the ways in which institutions shape these forces from place to place, and in so doing influence their outcomes. (Martin 2000:79)

Thus, institutionalist economic geographers argue that different institutional ‘regimes’ affect economic activity differently. Differing institutional configurations may help or hinder the development of particular industries through the generation of positive or negative externalities. Furthermore, it is at the regional and local levels that institutional configurations and history are the most important for economic activity. However, institutions develop slowly and are enduring components of the economic landscape, attributing path-dependence to the evolution of economic activity in particular locations (Martin 2000:80).

Following the line of argument advanced by economic geographers, Chang’s framework can also be extended throughout a given country’s territory. Different institutional configurations can and will support the market and the development of particular industries with varying degrees of success. The enforcement of both formal and informal rules and
regulations, and the way market and state institutions interact, is influenced by local-level institutional histories.

**Summing Up**

Thus, the state can be seen as a collection of institutions of governance with varying levels of capacity that, in turn, affect its ability to pursue specific goals. Regarding the market, far from occasionally intruding into its workings, institutions underpin and dramatically shape its performance and evolution. The market itself can be seen as a set of institutions that shape and constrain economic activity, and market performance is determined by how well these institutions work as well as their interaction with other institutions in the state and wider society.

In addition, economic activity is a location-specific activity and has a spatial dimension. Efficient and effective market performance at the local level is also shaped and constrained by local institutional environments and arrangements. Different institutional configurations across a national territory will have differing effects on economic development, as some will be more conducive for a specific industry than others.

Having set out the approach to studying institutions that this thesis will use, and having established that institutions can and do affect market performance, the next section will look at how specific institutional regimes can positively influence economic activity.

**‘Developmental’ Institutions**

According to Haggard and Moon, research on East Asian states and the role they played in promoting economic transformation has given rise to two debates (1990:211). The first, which can be termed ‘state versus market’, seeks to establish the extent to which these countries’ economic success was due to state intervention.³

³ This debate has been dealt with at length elsewhere and will not be the focus of this discussion. For a Neoclassical perspective see Lal (1983) and Little (1982). For a Structuralist perspective see Shapiro and Taylor (1990) and Colclough (1991).
The second takes as given that state intervention was productive, and seeks to understand why and how these states were able to intervene effectively. According to Weiss and Hobson, this approach 'decisively rejects' the state-market dichotomy, and instead highlights the 'synergy of competitive collaboration between government and industry'. This approach is aware that states have differing capacities to foster economic growth, and thus emphasis is placed on the 'political-institutional arrangements which underpin effective intervention' (1995:138). This approach involves studying aspects such as the state's internal structure, bureaucratic capacity, and relationship with the private sector.

Thus, the next sections will review relevant theoretical literature on the state and its potential to foster economic transformation, and will also put forward the theoretical framework that this thesis will use.

The Developmental State

The Japanese ‘Model’

The pioneering work on the Developmental State (DS) is Johnson’s 1982 study of Japan’s post-war economic transformation. Johnson argues that what distinguishes a Developmental State from other types of states (such as the ‘welfare’ or ‘regulatory’ variants) is the political priority attached to economic development above other considerations. He states that ‘nurturing the economy has been a major priority of the Japanese state because any other course of action implied dependency, poverty, and the possible breakdown of the social system’ (1982:307).

In addition to this political commitment, Johnson stresses four other aspects of the ‘Japanese model’.¹ The first is a small, but effective and meritocratic bureaucracy. This apparatus, staffed by selectively recruited ‘generalists’, is tasked with choosing specific industries for development, formulating plans to encourage upgrading, and ensuring competition within these sectors. The second is a political context that permits the
bureaucracy sufficient leeway to act proactively and effectively with a minimum of interference from politicians and vested interests. The third is the effective use of ‘market conforming’ methods of state intervention that include appropriate incentives for firms, public-private joint ventures, and coordination mechanisms. The fourth element is a ‘pilot agency’ like the Ministry of International Trade and Industry (MITI) that is able to ‘steer’ the economy through interventions in areas like planning, finance, international trade and industrial policy without stifling initiative (Johnson 1982:307,315-19).

**Governing the Market**

Subsequent work has used this framework to analyse Taiwan, and other, predominantly East Asian countries. Thus Wade (1990), in his analysis of Taiwan’s industrialization, argues that as with Japan, the country’s economic success lay in its high levels of investment in strategic sectors. The decisions as to which sectors to target were arrived at through ‘corporatist and authoritarian political arrangements’, between the state and industrial groups. These processes combined ‘government and entrepreneurial decisions’ to decide which sectors would receive support, and how incentives would be structured (1990:26).

Thus, Wade’s ‘governed market’ is characterised by: high levels of ‘productive investment’, which allowed the quick introduction of new technology into production processes; higher levels of investment in strategic sectors; and the emphasis on production for export. These strategies were made possible through Taiwan’s comparatively competent and insulated bureaucracy, as well as a small number of agencies that provided overall strategic direction (1990:196).

In his analysis, Wade distinguishes between ‘following’ and ‘leading’ the market. A market-following strategy consists of helping private firms in a given industry to achieve

---

4 It is important to note that Johnson did not originally envisage writing about a ‘model’ and, indeed, was rather pessimistic about the possibilities of successfully emulating the institutional components of the Japanese experience. See Johnson (1999:40-43).  
aims that they formulate. A market-leading strategy involves encouraging private sector firms to do things that they would otherwise not do, such as to use or make specific products, techniques, and technologies. The policies themselves may not differ, but the strategies depend on who initiates and promotes specific measures.

Wade's analysis is useful in the sense that it points out that the relationship between the state and the market can be different. In some contexts, the state may simply play a facilitating role, letting private sector firms develop and implementing policies to support their efforts. Conversely, the state may actually be an initiator, picking specific sectors and trying to foster growth.

**Embedded Autonomy, Intermediate States, and Pockets of Efficiency**

Evans (1992b, 1995) builds on this analysis, providing useful concepts for the analysis of state action. He argues that Developmental States have high levels of administrative competence due to their professional, stable, and meritocratic bureaucracies. Furthermore, these states have successfully reconciled autonomy from rent-seeking elements with 'embeddedness' in society in general and business groups in particular (1995:12). Thus, he argues that the freedom to implement policies to foster industrial upgrading combined with the bureaucratic competence to know how to intervene selectively and productively has been key.

Evans then sets out a variety of roles that the state can play in order to foster industrial transformation. They are: custodian, demiurge, midwife, and husband. The first simply means that the state adopts a hands-off role, restricting its actions to regulating market activity. The second entails the state assuming responsibility for production, most often through state-owned enterprises. The third refers to situations when the state actually creates an industry through policies and incentives. The last is less interventionist, and

---

6 In his words, the term 'embeddedness' refers to 'a concrete set of social ties that binds the states to society and provides institutionalised channels for the negotiation of goals and policies....it implies a concrete set of conventions that link the state intimately and aggressively to particular social groups with whom the state shares a joint project of transformation.' (1995:12)
means that the state fosters the growth of a given sector through protection or subsidies (1995:77-81).

In addition, Evans argues that different economic sectors require the state to play different roles, and these roles change over time as technological requirements and market players evolve. Of course, these roles are not played in a vacuum, and a state’s history in a given sector as well as its accumulation of social capital with industry players also crucially affect its ability to foment up-grading (1995:81-84).

As can be seen, Evans’ work is useful in enabling a differential analysis of how the state can foster economic action in new areas, or encourage higher value-added activity in established ones.

Evans also extends his analysis to so-called ‘intermediate’ and ‘predatory’ states. This is useful as the Developmental State framework has really only successfully been applied to Japan, Korea, Taiwan, and Singapore (Polidano 2001:516). Thus, analytical frameworks need to be adapted to cope with countries such as Malaysia and India whose institutional arrangements do not confirm to this ideal type.

Following this classification, Evans argues that predatory states exist solely to expropriate rents. Intermediate states, which comprise the bulk of developing countries, exist somewhere along the spectrum between the developmental and predatory extremes. They have some ‘semblance of bureaucratic organization, but not the degree of corporate coherence enjoyed by developmental states’ (1995:60). This then makes achieving an adequate level of embedded autonomy difficult, with either a lapse into rent-seeking or a loss of communication with business groups likely. However, Evans posits that these states can have ‘pockets of efficiency’, which are state institutions of an adequate professional standard that take the lead in fostering strategic sectors (1995:61).

Evans’ subsequent work attempts to distil these concepts further, seeking to ascertain which institutional arrangements are the most important for fostering industrial transformation and how can they be transferred to other countries, if at all. He argues that the East Asian
success stories all build on an institutional foundation consisting of a solid bureaucracy that works in collaboration with the private sector. He states agreement on basic institutional pre-requisites transcends continuing disagreements over which facets of policy are most crucial to East Asia’s economic success. Across various interpretations of policy there is shared conviction that economic success requires a highly capable, coherent economic bureaucracy, closely connected to but still independent of the business community. If there are transferable lessons to be gained from East Asia’s success, they almost certainly begin with this institutional combination. (1998:69)

However, Evans argues that, as with intermediate states, these institutional pre-requisites do not extend to the entire governmental apparatus, but rather are concentrated in specific parts. While lead agencies in East Asian states were meritocratic and professional, they often co-existed along with agencies characterised by extensive rent-seeking. Evans also argues that while there are institutional pre-requisites, there is no template for bureaucratic organization. East Asian countries have had a variety of institutional arrangements and, similarly, the relationship between the state and private sector has fluctuated over time.

To summarise, work on the Developmental State highlights three central characteristics, which are: ‘the single-minded adherence to growth and competitiveness at the expense of other objectives, the unusual degree of bureaucratic autonomy and capacity, and the equally unique and unusual degree of public-private cooperation’ (Onis 1991:120).

In analysing their respective cases, Johnson, Wade, and Evans stress the importance of bureaucratic capacity and independence to implement policies, as well as the over-riding political importance attached to economic transformation. While Wade and Evans have different terms for communication between the state and private sector, the central point they make is the need for effective and detailed communication between the two to guide and inform policy-making. It is further argued that the relationship between the state and the market can change over time.
In addition, through advancing the concepts of ‘intermediate’ state and ‘pocket of efficiency’, Evans’ work enables this framework to be applied to countries that are not developmental, but rather possess variable levels of institutional capacity. In these cases, specific agencies, rather than the state as a whole, display the developmental traits set out above.

The next section will analyse how these concepts can be fruitfully applied at the sub-national level.

**Sub-national Developmental States**

**The Emergence of Sub-national States**

While comparative work on state institutions has been very useful in shedding light on the relationship between a country’s institutional configuration and its economic success, the unit of analysis has been almost exclusively the nation-state. Political and economic developments now require the framework to be extended to encompass other levels of analysis.

At the political level, many countries have begun to decentralize or delegate resources and responsibility to lower levels of government. In some cases, this is due to a rolling back of state functions, in others it has been a conscious adoption of decentralization policies. Countries with federal systems like Mexico, Russia, and Brazil have ‘democratized’, allowing state or provincial governments more autonomy (Snyder 2001:94, Boniface 2002:2). Market reforms in China and India have also meant more responsibility being delegated to lower levels of government, and increasing intra-state competition for resources (Echeverri-Gent 1999:24).

However, disciplines like international relations or comparative politics are not well-equipped to cope with these changes (Montero 1997:1, Paul 2002:465). Doner and Hershberg point out an important lacunae in both economics and political science, arguing
the literature on economic development is increasingly cognizant of the importance of local and regional networks for economic success, but it pays surprisingly little attention to the role of sub-national institutions or policies in fostering these processes. Nor does it address the role of emergent local and regional interest groups in establishing new policy-making institutions or creating new channels of political representation. Students of comparative politics have seldom placed these political reforms in the context of changes associated with the dynamics of economic development in an era of globalization (1999:46).

There is, however, an incipient body of literature within comparative politics that looks at sub-national states and their capacity to foster economic growth. In particular, this literature has looked at sub-national governments in large countries such as Brazil, Mexico, India, and China, seeking to apply and extend existing national-level theoretical frameworks.

Approaches to Sub-national States

Some argue that sub-national units should be treated as an intervening variable that affects the implementation of policies formulated by the central government. For example, Wibbels (2001) argues that sub-national state structures can have a decisive impact on a nation’s overall economic stability. Attributes such as the fiscal autonomy accorded to state governments and the role of central party structures are key in minimizing policy divergence between different levels of government, and in turn ensuring fiscal prudence. Other studies look at specific countries, seeking to understand how decentralization can affect overall economic growth.7

Segal and Thun look at the Chinese municipal governments of Shanghai and Beijing and their ability to foster local industry. In particular, they look at the structure and capacity of each municipal government, the composition of the private sector, and the relationship between them. They argue that the differences shaped each municipality’s relative

7 Boniface (2002) makes a similar argument in his analysis on the effects of political decentralization in Brazil. He argues that decentralization will have mixed results, depending on the structure and capacity of state governments. Some will be able to develop innovative approaches and policies, while others will lapse into rent-seeking. Echeverri-Gent (1999), in his assessment of decentralization in India and China, argues that the way decentralization is implemented will have an impact on the capacity of state-level governments.
economic success. Segal and Thun argue that while national-level institutions constitute the general framework that shapes and regulates economic growth, differences across regions are due to the nature and capacity of local-level institutions. In particular, they stress the ability of a given local government to understand and meet local firm needs. Segal and Thun argue that

local governments do not simply try to reproduce and catch-up with development efforts initiated by the central government, but are often the actual architects of growth, designing and implementing development policies that are conducive to local institutional frameworks and specific development needs (2001:558).

Sinha looks at three state governments in post-1991 India, seeking to understand sub-national variations in economic performance. She argues that analysis needs to encompass state-level 'rulers', who have a vested interest in fostering and regulating economic activity in their territory (2003:461). Sinha stresses the interplay of two factors. The first is the variation across state governments in terms of their structure, capacities, and industrial strategies. The second is the relationship between the central and state governments. She argues that state governments with high levels of capacity and who cultivate good relationships with the central government enjoy the highest levels of economic growth.

While this theoretical work is still in its incipient stages, it is a good starting point for looking at sub-national states. Research by Remick, Segal and Thun, and Sinha seeks to extend the analysis of state structures downwards, arguing that sub-national states can be independent agents and emphasizing the importance of state capacity, autonomy, and good communication with the private sector for economic performance. Sinha also highlights the importance of central-state government relationships as a variable in fostering economic growth.
Developing a Theoretical Framework

The Characteristics of the National and Sub-national Developmental State

It has been argued that the three central characteristics of a Developmental State are: the prioritization of economic growth and competitiveness; high levels of bureaucratic capacity and autonomy; and high levels of cooperation between the state and private sector. These three ‘traits’ will thus form the basis of the theoretical framework that will be used in the chapters ahead.

However, it will be remembered that the relationship between the state and private sector can and must change over time, reflecting their evolving capabilities and the economy or sector’s needs – thus there are many ways the state and private sector can interact productively. In addition, in states characterised by ‘intermediate’ levels of capacity, specific institutions within the state can constitute important ‘pockets of efficiency’ that foster economic transformation.

In turn, sub-national states can be more than just local-level executors of national priorities. Sub-national states with high levels of capacity and autonomy can also be catalyzing agents at the local level, fostering economic growth and upgrading through constant communication with the private sector and the prioritization of economic competitiveness.

Diagram 2.1 sets out how the national and sub-national DS framework is conceptualised in this thesis. Thus, the national level state engages in detailed communication with the private sector, and the results of this dialogue are then fed into policy-making. Following this logic, the sub-national state does likewise, establishing channels of communication with the private sector which then influences policies.
However, it is important to state that the two levels of governance influence each other. In most cases, the direction will be top-down, with national level priorities and investments defining the sub-national state's room for manoeuvre. However, unlike Sinha, who posits that the causality is uni-directional, this thesis will argue that causality can run the other way, with sub-national states also influencing their national counterparts.

**Extending the Framework**

While the DS framework has great explanatory power, several theoretical aspects are nonetheless left underdeveloped. Some of these shortcomings may be inherent in the institutionalist approach, but many of these issues arise when elements of a ‘model’ are extracted from cases and applied elsewhere.

The first issue concerns theorizing about government-business interaction – be it in the guise of reciprocity, governing the market, or embedded autonomy. It is difficult to tell
when and whether the state is communicating adequately with the private sector, and if this communication yields concrete ‘developmental results’ (Menocal 2004:774). Furthermore, it is hard to tell when communication ceases to be ‘developmental’ and lapses into rent-seeking. That said, while analytically ‘fuzzy’, the arguments pertaining to communication and autonomy to point to qualitative differences in state structures, and the Developmental State work has been persuasive in documenting their effects.

The second issue concerns the private sector itself. Perez-Aleman (2003) argues that the development state literature privileges the analysis of state institutions over private sector institutions and, thus, does not look at relationships between firms such as networks, business associations, or consortia. However, Evans, for one, does not deny this, arguing that the relationship between the government and business groups can only be understood once the state’s internal structure has been established. Furthermore, state policy can alter the nature and composition of the business community, in particular as the economy grows (1997:66-67).

The third issue regards the treatment of the state as a ‘unitary actor’. Chibber (2002) argues that a ‘bureaucracy-centered’ view should also look at the relationships between government agencies. He states that in addition to the ability to ‘discipline’ firms, pilot agencies or lead bureaucracies should also have the ability to ‘discipline’ other government agencies. Chibber argues that this factor, in addition to the relationship with the private sector, is pivotal in explaining the different developmental outcomes of Korea and India.

The fourth and potentially most serious issue is the ‘de-politicized’ portrayal of the Developmental State comprised of impartial bureaucrats insulated and autonomous from wider political pressures. Kohli argues that the theory explains how Developmental States do things, but not why ‘developmental’ goals have emerged and are chosen (1999:97). Pempel takes issue with the ‘political’ analysis of DS work, arguing that it simplifies political issues through confining analysis to ‘intra-elite’ relationships among groups of

---

Kang makes a similar argument in his analysis of Korea, arguing that the Developmental State’s ‘benevolence’ cannot be assumed, but rather that constructive policies and positive outcomes are a result of a political context. He argues that in Korea’s case, public goods and subsidies were provided because of a political compact between state and private elites. While it provided spill-over benefits for others it was, in essence, a product of money politics and not the pursuit of neutral national ‘self-interest’ (2002:202).
bureaucrats, business leaders, and politicians. It does not look at broader social sectors and how they form coalitions and seek to influence policy (1999:145).

Thus, while useful, the DS framework needs to be extended. In the chapters ahead, when using the framework, particular attention will be paid to establishing the conditions in which state-private sector arrangements are useful for economic transformation and what role private sector organizations play in economic governance. Regarding state institutions, intra-agency cohesion and bureaucratic impartiality cannot be assumed, and the relationship between state institutions will be carefully analysed. And, perhaps most importantly, an analysis of institutions must be embedded within a broader political context, seeking to understand how this shapes the boundaries of action for political elites.9

**Summing Up**

This section has reviewed literature that is useful for understanding how specific institutional contexts can be conducive for fostering economic transformation. This work has singled out competent, autonomous states that emphasise economic growth above other considerations and engage collaboratively with the private sector.

Subsequent work has shown how states can play a variety of roles in order to foster growth, depending on the sector's attributes and firm capabilities. Work has also attempted to elucidate what institutional prerequisites are necessary for fostering economic growth in other, less 'developmental' contexts.

This discussion was complemented with research that looks at the role of sub-national levels of government in fostering economic transformation. As with their national counterparts, these researchers have looked at similar institutional configurations, including the structure and capacity of sub-national governments and their relationships with the private sector.

---

9 For a discussion of alternative theoretical approaches to sub-national states and economic transformation, please consult Appendix Two.
However, while the DS literature and its sub-national offshoot provide tools for understanding what institutional configurations can help foster economic growth, they are less useful for understanding how such institutions can do so. To this end, the next section will look at how specific policies can contribute to economic transformation.

‘Developmental’ Policies

In spite of the importance given to effective policy-making in fostering economic transformation, due to its emphasis on institutions, the DS school has not been particularly good at laying out the policy choices facing economically-ambitious states. Thus, this section will attempt to analyse and systematize the policy menu available to national and sub-national states seeking to foster economic growth and upgrading.

There are many definitions of industrial policy, which differ significantly as to its purpose and scope. This thesis will use Rodrik’s, where industrial policy refers to ‘restructuring policies in favour of more dynamic activities generally, regardless of whether those are located within industry or manufacturing per se’ (2004:2).

This definition is narrow enough to retain its emphasis on measures that have a direct impact on the sector or activity concerned, as opposed to necessary pre-conditions for successful policy implementation (i.e. law and order or macroeconomic stability). However, it is also flexible enough to encompass all sectors (including services) and policies that have either a general or sector-specific focus. Furthermore, its emphasis on dynamism goes beyond merely fostering economic growth, and is thus compatible with the definition of economic transformation advanced in Chapter One.

With this in mind, the next sections will look at what obstacles confront firms, and how policies can address them in the short and long-term. From there, regional economies and their special needs will be discussed, before proceeding to discuss policies that can be implemented by national and sub-national states.

10 See, for example, Haggard on Wade (2004:6).
The Workings of the Market

The Market and Its Failures

The Neoclassical approach to economic activity is based on the assumption of rational, utility-maximising actors. Individuals, firms, or households, faced by trade-offs due to scarcity, seek to maximise their self-interest. These entities act in a market that is assumed to be competitive and has the following four characteristics: there are many buyers and sellers who are all price-takers and not price-setters; production has decreasing returns to scale; goods are homogenous; and there is a perfect flow of information (Gans et al. 2000:4-6, Abelson 2003:57).

There are three reasons why the market is an efficient method of allocating resources: relative prices elicit corresponding changes in supply and demand; competition is a determinant of individual and institutional behaviour; and efficiency is central in determining the survival of economic actors (Gilpin 1987:20). This incentive structure forces producers to innovate, increasing the economy’s levels of productive efficiency.

For Neoclassical, or orthodox, economists, the market – due to its competitive nature and incentive structure – is thus seen as the most efficient way to allocate resources. This is not to say that the Neoclassical approach endorses laissez-faire but, rather, that the state should limit its role only to areas where it has a comparative advantage over the market. Such areas include a legal framework for market transactions, certain regulatory functions, and enforcing property rights.

Furthermore, in spite of claims that the market is the most efficient way to allocate resources, situations arise that justify state involvement. Some of these are termed ‘market failure’, and arise when ‘individually rational decisions made in a decentralized manner in response to price signals can lead to collectively inefficient outcomes’ (Chang 1999:186). Common market failures include: the non-existence of markets for public goods and

These market failures constitute a series of obstacles that firms must face in making everyday decisions, including whether to produce a new good, acquire technology, invest in research and development or worker training, and procure inputs. These choices are even more poignant and difficult in many developing country contexts that entail additional costs and risks, including insufficient regulation, lack of information, and insecure property rights (Dorward et al. 2005:8).

For example, while the market is, in theory, good at establishing a cost structure for different goods, it is unable to indicate prices for a good that has not yet been produced. Entrepreneurs who are seeking to produce a new good thus do not have reliable information regarding the return they could expect to make. However, if this undertaking is successful, the entrepreneur faces imitative entry, which threatens to eliminate profit margins. Thus, this 'information externality', if unchecked, can undermine an economy’s propensity for innovation (Rodrik 2004:9).

In addition, the acquisition of technology is also affected by a variety of market failures. The Neoclassical model assumes that apart from an initial investment, acquiring technology has no further costs, constraints, or risks. However, firms do not dispose of complete information on a particular technology and its alternatives, nor is technical 'mastery' of an acquired technology effortless and cheap. Rather, effective use of technology has a strong 'tacit' element that requires investments in skills, organizational practices, and technical expertise. The process is also inherently risky, as investments will not necessarily result in increased productivity, and is difficult for firms seeking to enter a new sector, who must learn how to use a particular technology while simultaneously competing against those who have mastered it (Lall 2004:11-12).

In addition, the Neoclassical model of perfect competition assumes decreasing returns to scale. However, production can also have constant or increasing returns to scale (Chang 2003:114). Furthermore, markets are good at giving signals for small changes in production

11 Some would also include addressing income inequality.
and investment, but they are not good at providing information on returns that can accrue from the adoption of important technology, or 'paradigm shifts' in production (Shapiro and Taylor 1990:862). Therefore, existing prices may not be representative of potential profits, leading firms to abstain from investing in potentially lucrative activities or seeking to work collaboratively.

These activities constitute imitative strategies, where firms behind the technological frontier, seek to learn from other, more technologically-capable firms. However, fostering innovation is even more difficult and expensive. Firm-level investments in research and development (R&D) suffer from low appropriability and a high propensity for spillovers, resulting in sub-optimal levels of investment. In addition, imperfections in capital markets may make these relatively intangible investments more costly. Similarly, firms who train workers may lose them to competitors, thus discouraging investments in skill acquisition (Stiglitz and Wallsten 1999:54-55). Furthermore, moral hazard may undermine effective collaboration between firms, thus impeding innovation and productivity gains from a more specialized inter-firm division of labour and mutual learning (Humphrey and Schmitz 1996:1860).

In addition, the production of an entirely new good may require a number of large investments in a variety of areas, including upstream and downstream industries, to become profitable. Thus, there is a role for the state to organize and coordinate the efforts of firms to collectively break into a new industry (Hoff and Stiglitz 2000:409).

This section has looked at the Neoclassical approach to the market, as well as different types of market failure and their implications. The next section will look at how economic activity has a spatial dimension and what this implies for the workings of the market.

12 For example, Rosenstein-Rodan's 'big push' theory argues that it would not be profitable for a firm to produce steel if there was no demand for it, yet no firms would use steel if it were not available (Hoff and Stiglitz 2000:409).
In the Neoclassical model of production and trade, the crucial determinants of the productivity of a given region or country are determined by factor endowments, technological differences, and free trade. The analysis is made at one point in time, there are no transport costs involved in moving goods, markets are perfectly competitive, and there are no increasing returns to scale. However, this approach does not factor in spatial or temporal issues, and thus does not deal with how institutions in different locations affect market performance (Gilpin 2001:103, Storper 2002:43).

A cursory analysis of a nation’s economy will reveal that its industries are not evenly spread throughout its territory, but rather concentrated in specific locations. For example, Chicago and Detroit were synonymous with manufacturing in the past, and Silicon Valley in California and Route 128 in Massachusetts are currently known for their IT industries (Scott 1998:64, Saxenian 1996:1-3).

Why, then, does economic activity ‘cluster’ or agglomerate in specific areas? Economic geographers argue that economic activity agglomerates in ‘localized geographical clusters’ for two reasons. These clusters can be ‘generalized’, meaning that they are the inevitable grouping of firms that occurs in large urban areas, or they can be ‘specialized’, meaning that they are comprised of groups of firms in the same or similar industries. The interaction between firms in both types of clusters generates externalities, or ‘spill-over’ effects, that benefit the group of firms as a whole (Dicken 2003:23).

A regional economic system’s externalities can be ‘traded’ or ‘untraded’ interdependencies. Regarding traded interdependencies, agglomerations of firms are more likely to have a wider range of specialized supplier firms, which will, through better quality inputs, quicker

---

13 New Trade and New Growth Theories, along with New Economic Geography (NEG) deal with some of these issues by factoring in imperfect competition, increasing returns to scale, and information failures. Regarding geography, NEG strives to understand how geography affects economic activity by factoring in transport costs, imperfectly competitive markets, returns to scale, and centripetal and centrifugal forces. See Krugman (1998) and Henderson et al. (2001). However, this approach does not provide convincing explanations for why one particular location, from a sub-set of similar locations, is chosen over others or how these locations’ institutional endowments affect their economic development. For these and other critiques see Martin (1999).
delivery times, and more competitive prices, increase performance of all firms in the cluster. In addition, agglomerations of firms are also more likely to offer ‘thicker’ labour markets, with a wider variety of workers with required competencies. These benefits are well known, and were first advanced by Marshall’s work on ‘industrial districts’ (Scott 1996:397, Storper 1999:25).

However, economic geographers also argue that clusters can benefit from ‘untraded’ interdependencies, which include greater opportunities for the interchange of ideas, techniques, technology, and business opportunities that arise from proximity between firms. This also extends to include positive changes in the local institutional ‘environment’, including localised mores and norms regarding quality, commercial cultures, and acceptable business practices. A positive institutional environment can mean that there is greater inter-firm trust regarding such matters as labour poaching, intellectual property, and collective reputation effects. Storper and Scott argue that:

once a regional production system and its associated complement of workers has come into being, it develops a specific character inscribed in informal rules and conventions that reflect its acquired forms of industrial specialization and past historical experience....thus the context helps to inculcate and facilitate relevant patterns of worker socialization (both manual and intellectual); it helps to maintain in the local community a sense of what constitutes good work, appropriate materials and quality of final outputs; and it directs budding entrepreneurial talents to forms of business activity that are most likely to succeed in the local area (1995:512).

That said, it is important to note that agglomeration can also generate negative externalities such as pollution, increasing rent, labour poaching, or intellectual property theft. Furthermore, local institutional environments can also have negative characteristics, such as high levels of distrust, or a tendency to compete on price as opposed to quality.

The abovementioned interdependencies, particularly those that are untraded, are what Scott and Storper call the ‘regional economic commons’ and have a strong public goods character. This is because while they generate positive externalities for all firms in a given
region, regardless of ownership. As discussed, in a conventional market setting, firms will tend to under-invest in goods that provide generalisable benefits, and moral hazard may undermine collective efficiency. Therefore, they argue that ‘these collective properties are rightfully objectives of public policy and social choice’ (2003:14).

Thus, the local or regional institutional environment can have an effect on an industry’s long-term success, and, indirectly, its geographic distribution. Storper and Scott argue that the geographical distribution of an industry goes through several stages. They state that when an industry for a good or service first develops, producer firms are often established in a wide variety of places. They state that this is due to the fact that these industries, because of their newness, do not rely on positive externalities in order to succeed. This stage is thus termed ‘an open window of locational opportunity’.

However, during the second stage, the number of locations is reduced as the industry’s local institutional context becomes increasingly important for success. Locations with environments that are more able to provide specialised inputs, supporting services, specialized labour, and opportunities for collaborative learning will begin to pull ahead of others, as their firms become increasingly competitive. After a period of time, this ‘process of cumulatively self-reinforcing development’ will mean that only a few locations will be the sites of a specific industry (2003:9).

Having looked at how economic activity can depart from assumptions posited in the Neoclassical framework and how market failures can arise, the next section will look at how state policies can tackle these issues.

State Policies

As has been argued, beyond the provision of public goods, the state can influence the market through a variety of interventions. Some merely seek to counter-balance or accentuate market mechanisms, and others seek to have a deeper and more structural effect. The next section will deal with these in turn.
Market Complementing Interventions

While the market does give rise to ‘failures’, it is pertinent to ask whether the state, whether national or sub-national, is able to remedy them. In the first place, a particular policy need does not mean that a state has the capacity to intervene productively. Critics of government argue that state action may be counter-productive or more costly than a given market failure, and the state can become prey to rent-seeking elements who seek to influence policy to their own ends. However, the role of public intervention in many successful instances of economic growth provides a counterweight to these assertions (Hoff and Stiglitz 2000:415).

In situations where market-complementing policies are implemented, they usually consist of bequeathing functions to a government body that is tasked with producing specific outputs which are intended to correct a given market failure. These ‘outputs’ fall under four categories: regulatory services (i.e. anti-trust legislation); pure public goods (i.e. defence, law and order); quasi-public goods (i.e. education, health); and making transfer payments (i.e. subsidies or tax credits) (Wolf 1979:113).

The next paragraphs will look at examples of specific policies to address these types of market failures. Following the definition of industrial policy set out above, the discussion will focus on those policies more directly related to fostering economic transformation, rather than those that constitute necessary preconditions for economic activity.

Encouraging ‘self-discovery’ – this involves state action to reduce the risk and/or initial cost of introducing new production technology or attempting to produce a new good for the market. Such state support should only be given if the technology is new, it has the potential to generate positive spillovers, and if the recipients are willing to subject themselves to external supervision (Rodrik 2004:26-28).15

14 However, instead of correcting a specific market imperfection, these corrective measures may also lead to ‘non-market failures’. Non-market failures ‘are due to the absence of non-market mechanisms for reconciling calculations by decision-markets or their private and organizational costs and benefits with total costs and benefits’ (Wolf 1979:112). This is because the incentives that face organizations, whether they are firms or state institutions, may lead to sub-optimal outcomes.

15 A more traditional variant of this policy would be termed ‘infant industry’ protection, where an incipient or fledgling industry would be protected from international competition through restrictive trade policy.
Providing sources of finance – this entails providing more flexible financing arrangements for firm needs, such as venture capital funds, access to investors, or less rigid requirements for loan disbursement. As mentioned, developing countries often have under-developed capital markets and banks are usually conservative and unwilling to provide loans for non-traditional or risky ventures. For their part, small and medium enterprises, while potentially a source of dynamism, often do not fulfill traditional banking criteria regarding collateral or accounting systems (Shapiro and Taylor 1990:875).

Reducing coordination externalities – this involves pinpointing coordination failures that prevent new activities and formulating means of addressing them. This can be done through consultation with business associations or in specific state-industry forums. Of course, these mechanisms need to be accompanied by measures to ensure accountability and preclude rent-seeking (Rodrik 2004:26-28).

Promoting inter-firm collaboration – this includes reducing information asymmetries to enable firms to engage in collaborative production, thus increasing productivity through collective learning and a more efficient inter-firm division of labour (Storper and Scott 1995:510).

Publicly funding research and development – this encompasses basic and applied R&D carried out by public institutions and firms. While some research may target new ventures, some may be oriented to choosing and importing suitable technology from abroad and formulating means of adapting it to local market conditions (Stiglitz and Wallsten 1999:54-55).

Promoting general technical training – this includes reducing the cost of technical, vocational, and language training, which may be under-provided by the market and hamper incursions into new activities. Such training may be offered directly by the public sector, or indirectly through subsidies or grants to the private sector (Scott 2002:153).

Managing foreign investment – this includes handling relationships with foreign investors and channeling investments appropriately. On one hand, foreign investment can play a very
important role in a country’s efforts to foster economic transformation. On the other, the interests of MNCs and the host country may diverge, as the former may simply invest to access domestic markets or resources, restructuring enterprises in ways unfavourable to the domestic economy, or crowd out local producers in product or capital markets (UNCTAD 1999:26).

Given the nature of these policies as well as the institutional arrangements necessary for them to work appropriately, these measures are more likely to be selective, rather than economy-wide. Rodrik argues that activities that attempt to diversify the economy’s structure should be targeted towards potentially rewarding activities, regardless of what sector they are in (2004:23). Lall states that it is not efficient to offer uniform measures across all sectors, when externalities and learning processes differ by sector or technology used. Thus, some activities may require minimal help or encouragement, and others may need a more long-term nurturing process (2004:14).

However, regardless of the sector or activity in question, firms should be exposed to market pressures to ensure efficiency, and help should be time-bound and contingent on performance criteria.

‘Developmental’ Interventions

The above-mentioned policies are market-complementing, in that they seek to bolster or counter-balance market allocations. However, a developmental state or its sub-national equivalent, may be called on to do more than this, including implementing deeper and more far-reaching structural changes in order to create, shape, or sustain the economic and political context necessary for fostering economic transformation. Some of these measures include:

*The formulation of a vision for development* – this entails articulating a long-term goal and strategy for a country or an economy, whether it is the creation of an entirely new industry

---

16 Hoff and Stiglitz term these types of policies ‘deep’ interventions that change the ‘dynamics of the political process’ as opposed to more technical, ‘shallow’ measures (2000:419).
or a push to upgrade a particular sector. Given the information and coordination externalities mentioned previously, the state is in a better position to express such a goal and marshal efforts towards attaining it (Chang 1999:190-99).

*Institution-building* – this involves the development, importation, or elimination of institutions necessary to underpin economic transformation. This can include creating new institutional arrangements or organizations such as a ‘pilot’ agency to oversee industrialization or provide credit, or fostering the emergence of an institutional environment conducive to more value-added economic activities. Again, due to its particular responsibilities and powers, the state is in a better position to do this than private sector actors (Chang 1999:190-99, Storper and Scott 1995:508).

*Conflict resolution* – this encompasses preventing, diffusing, or minimizing conflict that arises in the pursuit of developmental goals. Fostering economic transformation may: generate a significant number of ‘losers’ from a given change; require the elimination of powerful interest groups; or the pursuit of unpopular policies. Again, due to its attributes, the state will be drawn into conflicts of this nature and must be prepared to deal with them productively (Chang 1999:190-99, Putzel 2002:160-63).  

This section looked at the Neoclassical conceptualization of markets, before going on to discuss different types of market failures and policies to address them. From there, a variety of ‘developmental’ policies aimed at fomenting an economic and political context conducive to economic transformation were analyzed. The next section, for its part, will discuss the suitability of national and sub-national governments to implement specific measures.

**A Taxonomy of National and Sub-national Policies**

It has been argued that the national and sub-national level, the challenges involved in fostering economic transformation involve similar institutional configurations, namely the

---

17 For example, in his analysis of Japan, Taiwan, and Korea, Putzel lists three measures enacted by these governments that went beyond industrial policy and attempted to restructure their societies and preclude
bureaucratic capacity of the state and its relationship with the private sector, as well as similar market failures and policy options. However, is a specific level of governance more suited to implementing particular types of policies?

Gray and Dunning argue that

> economic policy can only be formulated by units which have the ability to tax (i.e. to generate revenues) to fund financial incentives, and the legal authority to initiate and implement a variety of measures affecting the creation, utilization, and geographical distribution of resources. (2002:410-11)

Thus, sub-national states, providing they have the authority to tax and spend, also have economic policy-making power, although their actions are shaped and constrained by national-level institutions and initiatives.

Therefore, while an issue may be common to both national and sub-national states, given its particular attributes, one level of governance may be more apt for policy implementation than another. The resources under the national state’s control and, presumably, its political legitimacy throughout the national territory, put it in a unique position to provide certain public services and goods, particularly those associated with economic and political stability and sovereignty. However, sub-national governments are, in theory, closer to their constituents and thus may be better placed to deliver other types of services\(^\text{18}\) (Abelson 2003:345).

Table 2.1 lays out market-complementing and developmental policies and classifies their importance for national and sub-national states. However, it is important to note that the allocation of responsibilities between levels of government changes over time and can be contested. As mentioned, the general trend toward greater decentralization signals a

---

\(^{18}\) Abelson argues that central governments are in a better position to carry out stabilization tasks, such as managing aggregate employment and prices, as well as distribution tasks, such as fostering equity and ensuring minimum living standards. In contrast, the provision of goods that provide localized benefits like health and education can be more efficiently performed by local governments (2003:346-47). In addition, even public goods such as macroeconomic stability and trade depend on sub-national units for implementation.
potentially greater role for sub-national states in the future. Furthermore, Rodrik argues that successful policy implementation must be based on a realistic analysis of available institutional capacities. In some cases, it may be better to implement a second-best policy option through a capable institution, rather than attempting to use an institution of indeterminate capacity to execute the most obvious policy (2004:17). This means that unexpected agencies may be the institutional vehicles for implementation and reform.

Table 2.1 The Relative Importance of Policies by Level of Governance

<table>
<thead>
<tr>
<th>Market Complementing Interventions</th>
<th>National State</th>
<th>Sub-national State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to finance</td>
<td>XXX</td>
<td>XX</td>
</tr>
<tr>
<td>R&amp;D funding</td>
<td>XXX</td>
<td>XX</td>
</tr>
<tr>
<td>Foreign investment regime</td>
<td>XXX</td>
<td>XX</td>
</tr>
<tr>
<td>Encouraging self-discovery</td>
<td>XXX</td>
<td>XX</td>
</tr>
<tr>
<td>Reducing information externalities</td>
<td>XXX</td>
<td>XXX</td>
</tr>
<tr>
<td>Reducing coordination externalities</td>
<td>XXX</td>
<td>XXX</td>
</tr>
<tr>
<td>Fostering inter-firm collaboration</td>
<td>XX</td>
<td>XXX</td>
</tr>
<tr>
<td>Targeted skills provision</td>
<td>XX</td>
<td>XXX</td>
</tr>
<tr>
<td>Targeted infrastructure provision</td>
<td>XX</td>
<td>XXX</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Developmental Interventions</th>
<th>National State</th>
<th>Sub-national State</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Vision’ for development</td>
<td>XXX</td>
<td>XX</td>
</tr>
<tr>
<td>Conflict resolution</td>
<td>XXX</td>
<td>XX</td>
</tr>
<tr>
<td>Institutional arrangements</td>
<td>XXX</td>
<td>XX</td>
</tr>
<tr>
<td>Institutional environment</td>
<td>XX</td>
<td>XXX</td>
</tr>
</tbody>
</table>

The significance ranges from negligible (-) to very important (XXX). Partially based on Gray and Dunning (2002:426).

With regard to market complementing activities, these can be provided by both levels of government. On one hand, while national governments can command greater quantities of resources, they are also beholden to a variety of sub-national units. On the other, sub-national states have fewer interest groups to please and, most importantly, should have more information on local economic activities. In addition, some policies, such as reducing coordination externalities need not require a great deal of resources (Rodrik 2004:13).

Thus, following this logic, more capital-intensive measures such as providing access to finance or funding research and development may be better implemented by national-level states. Similarly, national states may have more legal authority and power to negotiate with
international investors. However, sub-national governments may be better placed to facilitate investments, and reduce information and coordination externalities due to their greater access to information. This balance is even more likely to be tipped towards sub-national governments for measures that require long-term and piece-meal measures to foster inter-firm collaboration and create regionally-specific institutional arrangements.

Regarding the more ‘developmental’ goals, the more far-reaching and structural policies are likely to be better carried out by national states. However, a sub-national state may well be capable of articulating a long-term vision of development or resolving conflicts between different interest groups. While both national and sub-national states are able to create or change their organizational arrangements, it is likely that sub-national states will be better placed to altering their institutional environments in ways more conducive for economic transformation.

Diagram 2.2 The Developmental State and Policy Framework
Diagram 2.2 brings together the theoretical framework put forward in the previous section with the policy options discussed above. Aside from the provision of large-scale public goods, the policies available to national and sub-national states are similar. However, effectiveness will ultimately depend on the resources, legal responsibilities, and information available to – as well as the institutional capacity of – the level of governance in question.

**Summing Up**

The previous sections have argued that economic activity is shaped by its surrounding institutional context. In addition, in many industries, particularly skill and capital-intensive ones, production has a strong location-specific character as many firms seek to agglomerate to capitalize on traded and untraded interdependencies. While a new industry may arise in a variety of locations, over time, those industrial centres with more enabling institutional contexts will win out over other locations. These institutional contexts, or regimes, have a strong public goods character and are thus an important focus of public policy.

As can be seen, the policy 'menu' available to sub-national states does not differ a great deal from those open to their national level counterparts. While sub-national states have less legislative and financial resources to implement initiatives, they may be better placed to contribute to a region’s institutional context and culture in ways that can promote economic transformation.

**Conclusions**

This chapter has argued that institutional ‘regimes’, comprised of elements such as organizations (the institutional arrangements) and culture (the institutional environment) play a key role in supporting and shaping a given country or region’s economic trajectory. Specific institutional arrangements, such as a capable and autonomous state that prioritizes
economic competitiveness and establishes productive ties with the private sector offer the most promise for economic transformation. In states with more intermediate capabilities, the ability to foster economic growth and upgrading may come from a pocket of efficiency.

Sub-national states are more than offshoots of their national counterparts and also possess varying institutional configurations and levels of capacity. In circumstances where they resemble the developmental ideal, sub-national states can also be catalysts for economic transformation. While national states influence the context within which sub-national states perform, there is room for agency, and provincial states can also influence their national-level counterparts.

Above the provision of public goods, there is a range of market-complementing and more structural interventions available to both national and sub-national states to foster economic growth and upgrading. While the national state has more resources at its disposal, sub-national states may be in a better position to implement policies due to their greater proximity to local market actors.

In the chapters ahead, after looking at the specific economic sector in question, Malaysia and India’s institutional regimes will be analysed. Following the theoretical framework set out above, attention will be paid to each state’s institutional arrangements, seeking to establish the structure and capacity of the bureaucracy, the structure and composition of the private sector, and the relationship between them. From there, relevant policies and their outcomes will be evaluated to establish how they influenced the specific sector in question. This framework will subsequently be applied to Penang and Karnataka, in order to establish how the composition and policy choices of each sub-national state affected its respective economic sector.
CHAPTER 3

The Electronics Sector in Penang

Introduction

This chapter is the first of three that will explore how national and sub-national state institutions and policies have influenced the emergence and subsequent development of Penang's electronics sector, and whether they have successfully fostered economic transformation.

This chapter, for its part, will look at the electronics sector in Malaysia in general and Penang in particular. It will analyse how the industry has evolved, what capabilities it has, and its position in the international market. This will be done at the national and sub-national levels, in order to establish the performance of Penang's electronics sector relative to national and international competitors.

To this end, the chapter is divided into four sections. The first will provide basic background on the structure of the electronics industry, its hierarchy of tasks, and its expansion into East Asia. The second section will analyse Malaysia's electronics sector, assessing its performance and capabilities. The third section will assess Penang's electronics sector in more detail, using new industry information to evaluate its structure and capabilities as well as the challenges it faces. The fourth and final section will put forward the chapter's conclusions.

The Electronics Sector

As well as seeking to increase export earnings, many countries endeavour to foster a local electronics sector to boost local technological capabilities. A growing electronics sector can stimulate the development of downstream industries to supply specialized parts and inputs
and can also increase efficiency and productivity in other parts of the economy (Henderson 1994:258).

In addition to representing a very large market, estimated at some US$ 1.3 trillion in 2000, the electronics sector is growing quickly - averaging an annual 6.8 per cent growth rate between 1990-99 (Reed Electronics Research 2004:3). The sector has a high income-elasticity of demand and is ‘innovation-prone’, entailing potential for continual growth (Das 1998:68).

However, success in the electronics sector is far from easy, and not without risk. Continual technological advances mean that products have short-lived commercial viability, and the industry’s rapidly expandable production capacity for mature items constantly drives prices down. Fluctuations in demand and supply also mean that the market experiences periodic slumps (Ueki 2001:92).

**Definitions and Structure**

The electronics sector is very complex and encompasses a multitude of products, each with its own cross-country network of producer and supplier firms. The sector can be grouped into three sets of products: electronic equipment, electronic components, and consumer electronics (Diagram 3.1). Of the three groups, electronic equipment is the largest, accounting for about two-thirds of the sector’s market value. The electronic components sector follows in importance, accounting for about a quarter of the total. The consumer electronics sector is the smallest, accounting for approximately 10 per cent of market value (Das 1998:68).

While products in the electronic components and electronic equipment categories tend to be more capital and technology-intensive than those in the consumer electronics sector, all have specific products that are more competitive and have higher technological
requirements than others.\(^1\) Each product group also has items that are mature, whose barriers to entry are lower and less exacting for aspiring firms.

**Diagram 3.1**

**The Structure of the Electronics Sector**

### Electronic Components

- **Passive**
  - Resistors
  - Capacitors
  - Switches
  - Wires and Cables

- **Active**
  - Semiconductors
  - Memory Chips
  - Microprocessors

### Electronic Equipment

Computers and Peripherals  
Telecommunications  
Industrial Control Systems  
Office Equipment  
Aerospace and Military Equipment

### Consumer Electronics

- Televisions  
- VCRs  
- DVDs  
- Hi-fi equipment  
- Personal Computers  
- PDAs

Source: Dicken (2003:400)

While requiring different domain knowledge and capabilities, the manufacture of different electronics products follows an established sequence or value chain\(^2\), each with differing levels of value-added (Diagram 3.2). The sequence is as follows\(^3\):

**Research and development** – this involves tracking industry developments, forecasting future demand for products, developing new product concepts, as well as seeking to

---

\(^1\) For example, consumer electronics items such as high-definition TVs or LCD screens require formidable technological capabilities.

\(^2\) A value chain is defined as ‘the full range of activities which are required to bring a product or service from conception through the different phases of production, delivery to final consumers, and final disposal after use’ (Kaplinsky and Morris 2000:4).

\(^3\) This section is based on: Dicken (2003:407-8, 471-3), Mazurek (1999:48-53), and Doyle (2000:302).
improve product quality and yields through changes in production processes and equipment. This step is very capital-intensive, requiring a core of highly-skilled engineers.

*Design* – this encompasses developing and testing different products, often through computer modelling or making prototypes. Again, this step is highly skill and capital-intensive, requiring specialist staff and sophisticated equipment. Furthermore, investment in design work is only recouped after a significant lag, as many designs are made well ahead of production.

### Diagram 3.2

**The Electronics Value Chain**

![Diagram 3.2](image)

Source: adapted from ISIS (2002:5)

*Assembly & Testing* – this is the least skill-intensive and value-added part of the production process. Components of a particular commodity are assembled and tested, often requiring manual labour. In addition, packaging for shipment and delivery is often carried out at this point.

*Distribution* – this entails ‘intermediation’ between the various tiers of supplier and producer firms during the different steps in the production process. This includes not only the physical transportation of goods, but also the processing and communication of relevant information pertaining to them.⁴

---

⁴ Cross-border production networks and the advent of e-commerce make these tasks increasingly skill-intensive.
Marketing – this involves detecting market opportunities, formulating marketing strategies, brand management, cultivating customer loyalty, and developing strategic relationships to leverage technology, resources, branding, or market opportunities.

Following the definition of industrial-technological transformation set out in Chapter One, clusters of firms that master more value-added tasks such as R&D, design, and marketing move towards such a transformation. Few firms undertake all these steps themselves, as developing new products becomes increasingly capital-intensive and mastery of all aspects of production becomes more difficult. Thus, firms tend to specialize in particular tasks and become part of networks.

This section has looked at the electronics sector’s structure and value chain. The next section, for its part, will look at the expansion of the industry in East Asia, relating the distribution of tasks between countries to the hierarchy of value set out above.

The Electronics Sector in East Asia

The development of the electronics sector in East Asia can be divided into four phases. The first phase spans the 1960s, when Hong Kong, Singapore, Korea, and Taiwan (also called NICs\(^5\)) began to produce radio components and semiconductors for the American and Japanese markets (Hobday 1995:1173, Henderson 1989:51).

From the first investments in Hong Kong in the early 1960s, electronics firms spread out to the other NICs.\(^6\) In addition to cheap labour, these companies were looking for sites that offered political stability, good infrastructure, and few capital restrictions. As demand for standard products and components grew, offshore assembly became more attractive and, by 1969, 40 per cent of American semiconductors were being assembled overseas (Ruttan 2001:350).

\(^5\) Newly Industrialised Countries.
The second stage spans the early 1970s to the late 1980s, as the NICs moved into more technologically complex and skill-intensive areas of manufacturing. MNCs transferred more sophisticated tasks and set up regional headquarters and procurement centres in Singapore and Hong Kong. Korea and Taiwan successfully achieved industrial-technological transformation in the late 1980s, through developing indigenous manufacturing companies and entering higher value-added segments of the consumer electronics and semiconductor market (Hobday 1995:1174-5).  

Other East Asian countries such as Malaysia, Thailand, the Philippines, and Indonesia then moved into the sectors vacated by the NICs. As offshore production became more established and East Asia provided the requisite levels of manpower and political stability, MNCs started collaborating with local firms and setting up more complex facilities. Thus, companies began to create an intricate set of production networks across countries in the region, seeking to leverage different capabilities and prices (Yusuf 2004:4-5).

Over time, the ‘forward linkage effect’ attracted firms seeking to benefit from markets and positive externalities generated by their precursors and, in the late 1980s, enterprises from the disk drive and personal computer sectors also began relocating to East Asia (McKendrick et al 2000:7-8, Sturgeon and Lester 2004:45, Hobday 2001:20).

While MNCs were manufacturing almost exclusively for export, their presence offered opportunities for local companies, as MNCs needed supplementary assembly capacity to deal with periods of excess demand and some materials and inputs were available locally at lower prices. Policy initiatives implemented by host countries also made it advantageous for certain tasks to be carried out locally (Ernst 1997:44).

The third stage covers the end of the 1980s and most of the 1990s, when industrial upgrading continued in host countries and the incipient global production networks (GPNs)

---

6 This development led researchers to hypothesize about the New International Division of Labour (Frobel et al. 1980). However, significant industrial upgrading in East Asia has called this framework into question. For a more expanded discussion, see Hutchinson (2004:5-6).

7 By 1994, Korea had overtaken Germany to become the third most important semiconductor producer in the world, and Taiwan emerged as a centre of wafer fabrication with two of the largest semiconductor foundries in the industry (Dicken 2003:432-33, Hobday 2001:21-22).
became fully established. Trade liberalization, market deregulation, and advances in information technology made the management of such networks more feasible (Yusuf 2004:5).

Industrial upgrading continued as shortening product and production cycles also meant that locating engineering, design, and even some R&D closer to manufacturing sites was increasingly advantageous. Local firms improved their product and process technology through their exposure to international quality standards, and MNC employees constituted a pool of potential entrepreneurs (Hobday 1999:90). Local companies also strove to be incorporated in GPNs, which provided them access to markets overseas, market intelligence, and various forms of technical support (Yusuf 2004:7). However, most of the higher-end work still consisted of adapting existing products for the regional market (Felker 2003:263).

Governments attempted to re-structure their industrial policies in accordance with these developments. This was done through initiatives to attract clusters of related firms, fostering local small and medium enterprises (SMEs) in ancillary industries, and developing supporting services to attract MNC regional headquarters and operational control centres. Thus, rather than trying to create ‘national champions’ like Korea or Japan, Southeast Asian governments focused on attaining ‘more advantageous positions within MNC-orchestrated international divisions of labour’ (Felker 2003:265).

The Situation Today

However, recent trends in the electronics sector are reconfiguring this paradigm and dramatically increasing the level of competition for newer market entrants.

---

8 Global production networks (GPNs) are defined as ‘inter- and intra-firm relationships through which the firm organizes the entire range of its business activities for R&D, production definition and design, supply of inputs, manufacturing, distribution or support services’ (Borrs et al. 2000:1).
9 In the words of one MNC executive ‘Things evolve towards networks of companies that are less vertically integrated. The production and tasks move to where the leadership is... to where markets are... there is more collaboration between [MNC] branches now, as the network locates tasks to the location that does it best.’ Interview with Yoon Chong Leong, Director, Corporate Relations and Technology, Agilent Technologies, Penang (31/03/2004).
In the first instance, MNC practices are evolving in important ways. Established MNCs are focusing more on their ‘core competencies’ in areas such as R&D, concept development, and marketing. Tasks such as manufacturing and, increasingly, detailed design work are being outsourced. This decreases the need for large capital investments, allows profits from innovation to be achieved more quickly, and dilutes the risk of losses from fluctuating demands. MNCs are thus seeking longer-term relationships with a reduced number of suppliers, who, in turn, must acquire sophisticated technological capabilities, make formidable capital investments, and develop networks with other suppliers (Sturgeon and Lester 2004:36, 66-7). 10

While multinational supplier firms are making inroads in the electronics sector, countries such as Korea and Taiwan and, to a lesser extent, Singapore are becoming centres of technological dynamism and innovation. Rather than investing in the research and development of new technology, their efforts have centred on acquiring technology, diffusing it rapidly, and then concentrating on incremental improvements (Mathews and Cho 1999:4). 11

This development is supported by the emergence of innovative and competitive local companies, as high value-added microchip design work and process innovations are now being carried out by East Asian firms. Many such firms have used their production experience to make inroads in adaptive engineering, leaving the development of process innovations and marketing expertise until later (Ernst and Luthje 2003:7).

In addition, new countries are entering the market. In particular, China has emerged as the destination for FDI, receiving US$ 53.3 billion in 2003. Its share of FDI in the developing world has increased from 18.8 per cent in 1992 to 31.1 per cent in 2003 (Hew 2006:262). As well as receiving greater amounts of investment, China places cost pressures on other countries because of its lower wage structure. This competition is not uniquely confined to 10 This has been accompanied by a new production arrangement called contract electronics manufacturing (CEM), which entails outsourcing manufacturing, assembly, and some design work to supplier firms. CEM is expected to represent 30 per cent of the total electronics market by 2005 (MIDA 2004:3). Capitalizing on economies of scale for parts, CEM firms have moved aggressively into the manufacture and design areas that MNCs are vacating. The most successful possess networks of firms near key markets and formidable technological capabilities.
low-end assembly tasks, as China possesses formidable engineering capabilities and high volume capacity.\textsuperscript{12}

**Summing Up**

To summarize thus far, electronics production expanded to East Asia in the late 1950s and early 1960s. The industry sought out locations offering cheap labour, political stability, and free movement of capital. As MNCs consolidated their presence in host countries, some upgrading away from simple assembly work became possible. This was achieved either through fostering indigenous technological capabilities or by encouraging MNCs to relocate higher value-added tasks. This framework was relatively stable, affording countries time to progress from assembly work to more sophisticated tasks such as marketing, distribution, and design.

However, the electronics sector has changed in important ways since the mid-1990s, becoming markedly more competitive. MNC best practice is evolving, and production is now being parcelled between different countries to tap leading-edge capabilities. Supplier firms are now expected to learn how to undertake many capital and technology-intensive tasks more quickly. Globalisation has also exposed local firms to competition from international supplier firms. China is now the leading destination for FDI in developing Asia, and is threatening to undercut existing competitors on the basis of price and access to its markets.

Having looked at the electronics industry’s structure and evolution in East Asia, the next sections will look at the status of the sector in Malaysia and Penang – in particular how

---

\textsuperscript{11} This refers to the expected progression from original equipment manufacture to own design manufacturer and own brand manufacturer. For more details, see Kaplinsky and Morris (2000).

\textsuperscript{12} Interviews with: O.K. Lee, Northern Region Representative of the Federation of Malaysian Manufacturers, Penang (06/02/2004); Subramaniam Pillay, Associate Professor, School of Management, USM, Penang (16/02/2004); and Mark Chang, CEO of Jobstreet (a job portal with 2.5 million users in Malaysia, Singapore, the Philippines, and India), Penang (04/02/2004). In addition to seeking lower labour costs, investment is being channelled to China in order to tap its large domestic market and detect commercial opportunities. And, having such a large market puts China in a unique position to leverage technology, which may enable it to pull ahead of its competitors. For example, Motorola is currently the largest retailer of mobile phones in China and has set up a US$ 2 billion dollar wafer fabrication plant. Interviews with Robin Seo, Malaysia Country Manager, Motorola Technology, Penang (04/03/2004) and Tajuddin Carrim, ex-Director of Human Resources, Motorola Technology, Kuala Lumpur (04/05/2004).
successful they are in moving up the value chain and adapting to increasing levels of competition.

The Electronics Sector in Malaysia

This section will first set out the structure of Malaysia’s electronics sector before going on to discuss its recent performance and prospects for sectoral transformation.

The Structure

Since the first overseas investors in Malaysia began production in the early 1970s, the country’s electronics sector has grown consistently and rapidly. From simple microchip assembly, the country’s firms have also moved on to produce consumer electronics, computer equipment and, most recently, telecommunications and networking equipment (Ernst 2002:37).

Over the past 25 years, the sector’s output has increased more than 10 per cent every year, excepting 1985 and 2001 (EIU 2005c:24). In 2003, the sector generated almost US$ 50 billion in exports, which accounted for more than half of the country’s total exports and more than 70 per cent of its manufactured exports (Table 3.1, MIDA 2004:4).

The Malaysian electronics sector has traditionally been heavily oriented towards electronics components. While in 1984, components accounted for 85 per cent of electronics production, this decreased to 39 per cent by 2000 – with consumer electronics and electronic equipment representing 38 per cent and 13 per cent of the total respectively (Tham and Ragayah 2006:208).

Thanks to this performance, Malaysia now produces more electronics components than many OECD countries, and has been the leading developing country exporter of such items – cornering almost 10 per cent of the world’s semiconductor market (Ariff and Lai 2004:5, Athukorala 2002:5).
At present, the electronics sector comprises 360,000 people employed in more than 900 manufacturing firms and some 650 companies in supporting industries such as metal stamping, precision machining, mould fabrication, and electroplating (MIDA 2004:3-9). These firms and workers are spread across three production centres: Penang in the north; the Klang Valley in and around Kuala Lumpur; and Johor Bahru near Singapore. The three centres employ approximately the same number of workers, but, as the next section will show, have different technological capabilities.

Table 3.1 Key Indicators for Malaysia’s Electronics and Electrical Industries
(1990-2003)

<table>
<thead>
<tr>
<th>Year</th>
<th>US$ Bn</th>
<th>Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Output</td>
<td>Exports</td>
</tr>
<tr>
<td>1990</td>
<td>7.5</td>
<td>8.6</td>
</tr>
<tr>
<td>1991</td>
<td>9.5</td>
<td>11.1</td>
</tr>
<tr>
<td>1992</td>
<td>12.6</td>
<td>13.6</td>
</tr>
<tr>
<td>1993</td>
<td>16.4</td>
<td>18.2</td>
</tr>
<tr>
<td>1994</td>
<td>21.5</td>
<td>25.3</td>
</tr>
<tr>
<td>1995</td>
<td>28.4</td>
<td>34.0</td>
</tr>
<tr>
<td>1996</td>
<td>30.2</td>
<td>36.4</td>
</tr>
<tr>
<td>1997</td>
<td>22.5</td>
<td>28.2</td>
</tr>
<tr>
<td>1998</td>
<td>28.1</td>
<td>38.6</td>
</tr>
<tr>
<td>1999</td>
<td>34.2</td>
<td>47.3</td>
</tr>
<tr>
<td>2000</td>
<td>44.8</td>
<td>56.0</td>
</tr>
<tr>
<td>2001</td>
<td>38.0</td>
<td>48.0</td>
</tr>
<tr>
<td>2002</td>
<td>35.9</td>
<td>49.4</td>
</tr>
<tr>
<td>2003</td>
<td>38.7</td>
<td>48.2</td>
</tr>
</tbody>
</table>

Sources: Best and Rasiah 2003:34, MIDA 2004:4

As a result, Malaysia’s economy has been transformed, from one based on natural resources to one with a strong industrial component. In 2004, agriculture accounted for less than 10 per cent of GDP and manufacturing accounted for almost a third. This structural transformation has underlain much of the country’s impressive economic growth, which has expanded at an average rate of 7 per cent per year since 1970. 13

Industry Trends

In spite of the electronics sector's consistent, rapid growth and its importance for the country's economy, there are signs that its viability is in question.

In the first place, following the slump in the US market in 2000, the electronics sector contracted significantly and has yet to fully recover. Thus, output fell from US$ 45 billion in 2000 to US$ 36 billion two years later. The number of workers employed in the sector also dropped, down from 420,000 in 2000 to 345,000 in 2002, before climbing again in 2003 (Table 3.1).

Second, there is clear evidence that Malaysia is being threatened by the emergence of low-cost competitors. For example, China is now, after Singapore, the largest recipient of FDI from American semiconductor firms and receives the most investment from Japanese electronics firms – both positions once occupied by Malaysia (Ernst 2004:112-3). Furthermore, other locations like the Philippines and Thailand also offer lower-cost industrial labour forces, eroding Malaysia's comparative advantage. According to UNCTAD 'From ranking among the top ten until the mid-1990s, Malaysia fell in ranking every year in the latter part of the decade, reaching 75th place in 2001-2003' (in Hew 2006:262).

Third, the most aggressive and labour-intensive sectors have begun to relocate to China. According to an industry observer, companies have to deal with quality control, logistics, and sunk costs in order to move, thus requiring an appetite for risk and a certain size to withstand the transition. At present, relocation is being implemented by 'those ahead of the

---

14 In addition to lower production costs, it would appear that China is marketing itself effectively and aggressively. Government officials are actively targeting manufacturing investments in other East Asian countries, and offer formidable incentives and large quantities of skilled labour. Furthermore, the sheer quantity of companies in China allows greater specialisation and efficiency, and low labour costs also allow companies to install rigorous quality control mechanisms. It would also appear that the rate of technological learning is quicker in China, albeit from a lower base. One estimate is that it takes 2-3 years to adequately transfer technical knowledge to supplier firms in Malaysia versus only one year for their Chinese counterparts. Interviews with O.K. Lee, Firm C, Penang (12/03/2004), and Toh Kin Woon, State Executive Councillor for Economic Planning, Education, and Human Resources, Penang (02/04/2004).
game', which are in the utilities and hard disk drive sectors. However, this will soon spread to other segments of the industry.\textsuperscript{15}

Why, then, is this occurring?

In the first place, Malaysia’s electronics sector relies overmuch on a limited number of products, in particular semiconductors. While the share of consumer electronics and electronics equipment as a proportion of total electronics production has grown in recent years, the sector is still dangerously reliant on a limited number of items (Ernst 2002:41).

Second, the sector has few links to the domestic economy and is heavily reliant on exports to a limited number of markets. For example, exports to the US represented a full 24 per cent of GDP in 1999 (Ernst 2002:41). As a result, the Malaysian electronics sector is vulnerable to trends in a limited number of markets overseas.

Third, the electronics sector essentially comprises the more labour-intensive assembly and testing segments of the value chain. A significant proportion of intermediate inputs are not manufactured locally, but rather are brought in from overseas – as evinced by the high quantities of imports in Table 3.1.

Fourth, the bulk of capital-intensive manufacturing is carried out by MNCs, rather than local companies. Foreign direct investment accounted for approximately 80 per cent of capital investment in the electronics sector in 2000. In contrast, the country’s supplier base is underdeveloped and not particularly innovative. There is little inter-firm learning or collaboration, thus limiting the potential for scale economies or more rapid process innovation (Best and Rasiah 2003:57).

In this context, given the heightened competition in the industry, Malaysian supplier companies are not well-positioned. Rather, they are placed in the position of having to pursue five strategies simultaneously, which are: establishing reputations as low-cost manufacturers of niche products, dramatically increasing their geographic coverage,

\textsuperscript{15} Interview with Yeoh Keat Seng, Chief Investment Officer, Commerce Asset Fund Managers, Kuala Lumpur (11/05/2004).
diversifying their products, developing the capacity to offer knowledge-intensive support services, and bolstering design and R&D capabilities (Ernst 2003:22).

This section has set out the structure and recent performance of the Malaysian electronics sector. It has argued that in spite of contributing to rapid economic growth, the country’s attempt at industrial-technological transformation has not been a total success. In general, the Malaysian electronics sector has not been able to move up the value chain to undertake more sophisticated tasks such as R&D, design, and distribution. Rather, the country’s technological capabilities are shallow and past competitiveness has largely been based on low-cost labour.

The next section will assess Penang in greater depth, setting out its capabilities in relation to Malaysia as a whole as well as its international competitors.

The Electronics Sector in Penang

With a population of 1.4 million, limited land area, and scant natural resources, the state of Penang has emerged as Malaysia’s pre-eminent electronics manufacturing centre. In 2000, the state produced half of the microchips in the global market (The Star 10/12/2000) and currently possesses ‘world class capability in assembly and testing of semiconductors and components, computers and peripherals, machine tool support, and consumer electronics’ (Best and Rasiah 2003:40).

Over the last 35 years, the sector’s growth has been rapid and has conferred many benefits to the province. Its economic structure has been transformed from an economy based on trading to one with a strong manufacturing base – which now accounts for more than 40 per cent of its Gross Regional Product (GRP). From a per capita income 12 per cent below the national average in 1971, the state now enjoys a per capita income some 40 per cent above average (Salih and Young 1987:104, SERI 2005:6).
Penang and its Competitors

Penang has clearly emerged as the centre for electronics manufacturing in Malaysia – well ahead of the Klang Valley and Johor Bahru. Penang has specialised in the semiconductor and hard disk drive sectors, benefiting from the rising technological standards associated with these goods. In contrast, the Klang Valley and Johor Bahru have specialized in less technologically-intensive sectors.16 Although firms in the Klang Valley produce electronics components and telecommunications equipment, the bulk of production consists of consumer electronics. In turn, Johor Bahru’s electronics industry consists of largely unskilled, labour-intensive operations for Singapore-based MNCs (Best and Rasiah 2003:40, Best 1999:8, Narayanan 1999:66).

Penang-based firms have been more successful in establishing outsourcing relationships with MNCs and can perform more technologically complex and high value-added tasks. 17 Work comparing the clusters show that a greater proportion of supporting firms in Penang are local, whereas they are predominantly foreign-owned in the Klang Valley (Narayanan 1999:60). In addition, Penang-based companies are also more likely to have accessed technology through outsourcing and subcontracting relationships, whereas firms in the Klang Valley are more likely to obtain them through parent companies or equipment purchase (Narayanan 1999:60-61).

Penang-based firms have also shown a more sophisticated inter-firm division of labour, which promotes greater efficiency and learning. Furthermore, supplier firms in Penang offer a wider, more sophisticated range of products than their Klang Valley counterparts (Rasiah 1994:280, 2001:171, Narayanan 1999:62).

This greater technological depth is due, in part, to the sustained presence of a group of MNCs. Some have described these firms as ‘developmental’, due to their long time horizons, decisions to relocate high value-added activities to Penang, and work with local

---

16 The Klang Valley’s electronics sector started in the early 1970s in tandem with Penang’s. Johor Bahru’s cluster emerged in the 1970s with the relocation of Singaporean operations searching for lower labour costs. For more information, see Best (1999), Best and Rasiah (2003), and Rasiah (2002a).
firms to encourage technological upgrading. Thus, a group of MNCs have upgraded their Penang-based facilities considerably. Some examples are the following:

- Motorola has invested more than US$ 1.1 billion in its Malaysian operations and currently employs 8,000 people in two manufacturing sites, an R&D centre, and a distribution centre for the Asia-Pacific. The R&D centre has a core of 400 design engineers and undertakes work on radios and cordless phones for affiliates in Asia. Future plans include carrying out more value-added activities, particularly research on the development of new digital communications platforms (The Star 03/03/2000, The Edge 24/06/2004).

- Intel currently employs 8,000 people and has allotted some US$ 1 billion for upgrading over the last 10 years. Its design centre now carries out original design work, specialising in integrated circuits and boards and obtaining patents for new products. The Penang-based affiliate also is responsible for the distribution and marketing of new products in the Asia-Pacific region (FEER 06/07/2000, 15/05/2003).

- AMD has a 500,000 square foot facility in Penang, which is its largest plant outside the US. The facility specialises in chip design, assembly, and testing, having the capacity to process up to 8 million units per week (The Star 02/10/2001).

- Agilent has invested some US$ 790 million in its facilities in Penang. It employs some 1,100 engineers out of a total staff of 5,000, and has transferred the manufacture of disk drives to Penang from its UK plant (The Star 26/02/2003, New Straits Times 27/08/2002).

- Siemens’ facility in Penang is now the company’s global centre for the production of opto-semiconductors. It has also developed leading capabilities in total quality management and production organisation, and regularly trains staff from other affiliates (Ariffin 2000:155).

---

17 Best and Rasiah show that firms in Penang are up to the third and fourth level of technology transfer, whereas those in the Klang Valley and Johor are still at the first (2003:41). For more details on the levels of technology transfer, consult Rasiah (2001:186) and Best and Rasiah (2003:40-1).

18 This has not always been easy, as Motorola’s Country Manager relates ‘Thirty years ago, it was very difficult for Motorola to take steps towards greater value-added. There was no capability, nobody to hire. You had to train, send them over to the States and work with them for 2-3 years. Before, design work was difficult and it was hard to build up the reputation within the company... building [a reputation] is very critical, if there are too many mistakes, then it is over. First mover advantage is not applicable here. It is easier to follow, as there is no market. You have to build the market.’ Interview with Robin Seo.

19 Motorola is selling off its operations elsewhere in Malaysia, only retaining its presence in Penang. Interview with Robin Seo.
Hitachi, through its Design Application Lab established in 1992, has high-end capabilities for semiconductor design applications for telecommunication and consumer electronics products, which also offers services to other affiliates (Ariffin 2000:152).

These companies have, in turn, attracted world-class supplier firms. Four out of five of the world's largest contract electronics manufacturers are in or near Penang, and Altera, a leading semiconductor design firm, has also set up facilities there (Ernst 2004:139, Best and Rasiah 2003:42). While these companies may compete with top-end local firms, they are also important assets that can help attract other MNCs that require well-developed supplier bases.

In addition, these MNCs have acted as an 'invisible college' due to their extensive investments in training and the exposure of their workers to leading-edge technology and organizational best practices (Best 1999:16). Furthermore, MNCs, in particular from the US, have recruited many Malaysians into their senior ranks, who have pushed for more high value tasks to be relocated to Penang (Ong 1999:107).

MNCs have also contributed to the creation of local companies. Some have encouraged local start-ups, others have bolstered local technological capabilities through extensive technical support, and many independent entrepreneurs were originally MNC employees. All of these mechanisms have contributed to a generation of local electronics firms, some of whom have gone on to become MNCs themselves.

For example, locally-owned companies like LKT, Metfab, Prodelcon, Rapid Synergy, SEM, Eng Teknologi, and Choong Engineering gained a great deal of technical knowledge from working with Intel. Wong Engineering benefited similarly from its work with Motorola, as did Polytool and Rapid Synergy from subcontracting for AMD, and Atlan from Sony (Rasiah 2002:108, Ariffin 2000:186).

20 For example, Dell was attracted by Penang's supplier base. It has set up manufacturing and assembly facilities to produce 95 per cent of the company's notebook computers for the North American market and invested US$20 million in establishing its customer centre for the Asia-Pacific (The Star 01/04/1996, Electronic Business 11/1/2003).

21 In some cases, these working relationships involved much more detailed interaction. Intel's work with Globetronics and Unico involved loaning equipment and staff, providing financing, and monitoring production over a period of several years. Similarly, Motorola established BCM and worked for five years to
As a result, there is now a generation of established local electronics firms. Some of these have become MNCs themselves, establishing offshore operations. Eng Teknologi and Altan have plants in China, the Philippines, Thailand, and Indonesia. AKN Technology has operations in China, Korea, India, Singapore, and the US. PK Electronics has expanded to the US, where it has located its assembly operations and marketing department, retaining its R&D centre in Penang (Best and Rasiah 2003:41, Ariffin 2000:16).

Thus, this section has argued that Penang has begun to move up the value chain, away from simple assembly tasks towards hosting significant design, marketing, and distribution tasks, as well as incipient R&D work. In some specific niches, such as telecommunications and opto-semiconductors, it is emerging as a global leader.

The Electronics Cluster and Supporting Firms

At present, Penang’s electronics sector is comprised of 700-800 firms, which employ some 120,000 workers, and are largely located in state government-owned industrial parks. The sector’s core is a group of 160 mostly foreign electronic component producers. Over half of these firms are large, capital-intensive operations that account for the bulk of the sector’s manufacturing employment (85,000 workers) and invested capital. This group, in turn, provides business for an array of supporting industries for inputs like machine tools, automated parts, chemicals, rubber-based products, plastics, and paper products. These supporting sectors employ some 35,000 workers (Diagram 3.3).
Diagram 3.3  The Penang Electronics Sector

**Electronics Cluster**
- Passive Components
- Semiconductors
- Computer & Peripherals
- Consumer Electronics
- Telecommunications
- Optoelectronics
  - Employment: 84,650
  - Number of firms: 164
  - Large firms/SMEs: 88/76
  - Foreign/Join-venture/
    local:58%/19%/28%
  - Paid up capital: US$ 789 million

**Rubber-based Products**
- Employment: 4,300
- Number of firms: 21
- Large firms/SMEs: 2/19
- Paid up capital: US$ 120 million

**Chemicals**
- Employment: 4,500
- Number of firms: 51
- Large firms/SMEs: 11/40
- Foreign/Join-venture/
  local: 25%/40%/35%
- Paid up capital: US$ 179 million

**Machine Tool/Auto Parts**
- Basic Metal Products
- Fabricated Metal Products
- Machinery
  - Employment: 15,850
  - Number of firms: 213
  - Large firms/SMEs: 29/184
  - Foreign/joint-venture/
    local: 22%/9%/69%
  - Paid up capital: US$ 371 million

**Plastics**
- Employment: 7,100
- Number of firms: 83
- Large firms/SMEs: 11/72
- Foreign/Join-venture/
  local: 0/21%/79%
- Paid up capital: US$ 70 million

**Paper Products**
- Employment: 5,300
- Number of firms: 66
- Large firms/SMEs: 20/46
- Paid up capital: US$ 265 million

**Sources:** Diagram adapted from SERI 2001a:5-9, statistics from DCT Annual Survey of Manufacturing Industries in PDC Industrial Areas (2000-02), Ong 2000:20, and JICA 2001:7.10.

**Notes:** SMEs have an annual sales turnover under US$ 6.5 million or less than 150 employees.
Not all companies in supporting industries cater to the electronics sector – for example, the chemicals group also produces fertiliser, the paper group produces stationery, and the rubber group produces latex gloves. However, there is a considerable number of SMEs that cater to the electronics industry that are not included because they are not on land sold by the Penang Development Corporation.
The strongest inter-industry links are between the electronics and machine tool clusters. Machine tool companies offer services such as precision grinding, milling, metal stamping, and automated machinery to electronics producers (SERI 2001a:5-9). This cluster is comprised of a group of 200 firms, which are predominantly SMEs and largely locally-owned, employing some 16,000 workers. It is the second most important cluster in terms of employment and paid-up capital. Of its three constituent groups, the basic metal producing companies are majority local-owned, with more foreign ownership in the more technologically-complex fabricated metal products (supplying products such as tools, jigs, and fixtures) and automation (providing machinery and equipment) (SERI 2002b:7).

The other sectors are similarly comprised of smaller, locally-owned companies. The chemical, rubber, and plastic sectors provide inputs for the electronics firms, and the paper products cluster provides packaging for finished products. While these clusters cater for the electronics sector, they also offer services to other locally-based industries.

In addition to these companies, the remainder of Penang’s electronics industry consists of small second or third-tier supplier firms that operate in private industrial parks or on residential property.

**Challenges and Constraints**

However, after largely consistent growth over the period 1971-1995, the electronics sector is now at a crossroads. Using new industry information, this section will argue that while Penang has established capabilities, a core of multinationals present for more than 30 years, and a generation of local supplier firms, it is confronting the possible obsolescence of its development model due to structural changes in the electronics industry and the emergence

24 For a detailed account of the steps and material requirements for the semiconductor manufacturing process, see Mazurek (1999).

25 There are no precise figures for the number of firms or workers in the electronics sector. These figures refer to employees and companies in Penang Development Corporation (PDC) industrial parks. Thus, these figures
of new competitors. Some are even predicting the demise of Penang’s manufacturing industry, likening it to Ipoh - a predominantly Chinese city that housed a world-class tin mining and smelting industry in the early 1900s that is now defunct.26

A Sector in Decline?

The most visible trend is a wholesale reduction in employment. After growing continuously for 25 years, the number of workers employed by electronics producers levelled off after 1997 at around 120,000. After dipping slightly in 1998 and 1999, then recovering in 2000, the number of jobs fell by approximately one third, down to about 85,000 (Diagram 3.4).27

There is evidence that production in the more labour-intensive segments of the electrical and electronic industries such as televisions, air conditioners, refrigerators, and other electrical apparatus has fallen since 2000 (The Edge 25/02/2005). Manufacturers of mature products have begun to relocate production to lower-cost locations. For example, Philips moved its audio manufacturing facilities to China in 1997 with the loss of 1,500 jobs, and Grundig has relocated out of Malaysia altogether (The Edge 28/11/2000, The Star 21/07/97).28

This development is not necessarily negative, as it could indicate a transition to higher-skill and more value-added tasks. Indeed, the number of electronics facilities in Penang State industrial parks stayed at around 150 during 1996-2000, before jumping to 164 in 2001 (DCT Annual Survey of Manufacturing Industries, 2000-02).

26 May overstate the reliance of supporting firms on electronics companies, as many do cater to other industries. However, these figures do not include the many supplier firms who operate outside these parks.

27 As mentioned, this figure refers specifically to employees in firms in state-owned industrial parks. As such it is quite likely that job reductions have been greater, both in terms of electronics sector as a whole and supporting industries.

28 According to a representative of Penang’s premier business association, firms that specialise in ‘white box goods’ are relocating - ‘Anything that is bulky and relies on assembly is liable to go’. Interview with Danny Goon, Honorary Treasurer of FREPENCA, Penang (05/02/2004).
However, this has also been accompanied by large-scale reductions in higher-end and more value-added industry segments, such as the hard disk drive sector. Companies like Read-Rite, Seagate, Applied Magnetics, and Hewlett Packard have reduced or closed down their manufacturing facilities, relocating to locations like the Philippines and Thailand and retrenching some 10,000 workers between them (Ernst 2004:136, Far Eastern Economic Review 06/07/2000, 12/04/2001, 02/05/2002).

This has not been confined solely to the hard disk drive sector – but has also affected other high-end segments such as chip design and software development. Over the period 2000-03: AMD cut its workforce in half with a loss of 1,300 jobs; ACER retrenched 700 of its 2,300 workers; and Dell moved its entire production for the Japanese desktop market from Penang to Xiamen, China (The Edge 25/05/2001, 27/09/2001, The Star 15/6/2000, 09/01/2003, The Sun 29/04/2003, Ernst 2003:18). MNCs are also relocating their software development work out of Penang to locations in India, seeking to tap into the depth of its talent pool.²⁹

²⁹ Interview with Mark Chang.
In addition, local entrepreneurs in supporting sectors have also been hit, as orders for equipment, parts, and supplies have fallen. Solectron and Unico lost 1,200 and 800 workers respectively. In response, local companies like Pensonic and Wong Engineering have changed their sourcing policies, opting to procure inputs from overseas suppliers. Some domestic firms are even moving parts of their production processes to lower-cost locations abroad (The Edge 05/09/2001, 12/11/2001, 11/03/2003).

In addition to job reductions, Penang has also been affected by decisions to locate new investments elsewhere. Thus, MNCs like Agilent, Motorola, and Dell have decided to expand production facilities in China from their bases in Penang, particularly after 1998. While Intel’s last investment in Penang was a US$ 40 million design plant, it simultaneously opened a US$ 375 million assembly and testing facility in China (Boston Globe 05/10/2003).

Investment into Penang after 1995 has shifted in nature, away from establishing new facilities towards expanding or simply maintaining existing ones. This was confirmed by interviews with MIDA and state government officials, who state that it is difficult to get new investments. Rather, according to a senior Penang State Government official, the challenge is now to retain existing investors and not give them an excuse to leave.

So, despite its leading status vis-à-vis other local provinces, what accounts for the sudden downturn in Penang’s economic fortunes? The paragraphs ahead will provide an explanation.

---

30 Interview with Danny Goon.
31 Interviews with: a MIDA official, Penang (06/04/2004); Penang Development Corporation officials, Penang (13/04/2004, 20/04/2004) and a SMIDEC official, Penang (05/03/2004). There is anecdotal evidence that local entrepreneurs are leaving manufacturing and moving into food processing and agriculture. SMIDEC, the federal government agency for small and medium enterprises, encourages the firms it works with to move into sectors that are ‘less technologically intensive’ such as handicrafts and halal food.
32 Interview with Boonler Somchit, Executive Director, Penang Skills Development Centre, Penang (20/02/2004).
Structural Shortcomings

Recent changes in the industry have dramatically ratcheted up the level of competition. Supplier firms are now being expected to produce more, cut costs, and constantly introduce new technology. Profit margins are smaller, and suppliers cannot rely on long-term planning and extended lead-time from client MNCs, they must now be able to respond to spot orders. In addition, local firms are being asked to fill global contracts, often for orders many times their existing capacity.

This level of competition is new to the Penang electronics cluster, and has exposed several structural shortcomings. The first, and most obvious, is its underdeveloped base of supplier firms. In 2001, Penang could boast of some 455 firms supplying plastics, machine tool, and packaging services directly or indirectly to electronics MNCs. This number was almost triple the amount of SMEs existing in 1993 (Rasiah 2002:110).

Notwithstanding this, the breadth and depth of this cluster of firms is insufficient for the electronic sector’s emerging needs. Despite recent growth, there are too few SMEs. Taiwan, with a similar population to Malaysia and similar proportion of GDP derived from manufacturing has approximately three times as many small and medium-sized companies. In particular, very few of Penang’s small firms grow. A survey of 109 local supplier firms found that more than 90 per cent of them are small, with less than 50 employees and little working capital (JICA 2001:2.27).

As a result, Penang’s supplier base is not sufficiently diversified. A Japanese International Cooperation Agency (JICA) survey found that there were not enough firms offering crucial production services to larger companies. There were not enough service providers in the areas of precision engineering, materials processing, and component production (JICA 2001:2.27). In addition, new and increasingly vital supporting services such as software are underdeveloped. 

33 Interviews with B.L. Ooi and Firm B, Penang (04/03/2004).
34 ‘We are not talking about orders for a thousand parts, but rather a million’. Interview with Boonler Somchit.
35 According to one successful local firm, who outsources to some 500 people: ‘I am not happy with the supplier base. They do not have adequate technical knowledge. They are not financially well-prepared, they
The sector's second major shortcoming is its limited technical and innovative capabilities. More than 90 per cent of the capital in the electronics sector is foreign, and there are no more than a handful of local firms that have successfully become electronics producers. Thus, most domestic firms are in the less technologically-intensive metal product, packaging, chemicals, and rubber sectors.

Furthermore, many supplier firms have crucial deficiencies in many aspects of their production processes. The JICA survey found that local firms were lacking vital skills such as design capabilities, time management skills, and the capacity to handle large volumes of goods. Thus, only 24 per cent of the companies possessed adequate processing capabilities, 14 per cent had requisite production control capabilities and 15 per cent had adequate management capabilities (JICA 2001: S.2).

Local supplier firms also do not offer high-end or innovative products or services. The persistently high-import content of locally-made products suggests that most local firms do little more than assemble components for their final products. One firm owner states that of the 300 Penang-based firms involved in automation, only 20-30 carry out any design work. This is because they need to have the resources to employ 10-12 engineers exclusively for design, and there is a slower return on investments and greater risk involved.

Thus, this makes it hard for MNCs to outsource more tasks and, particularly, more sophisticated tasks without long periods of 'hand-holding'. According to an industry observer,

A number of MNCs are rooted in the country, partly through Malaysian managers. They want to upgrade but it is difficult for them to do that. The issue now is that SMEs are too short-termist. They need to upgrade their skill sets and need to be

---

36 'If you are talking about products, don't talk about Penang'. Interview with senior managers at Sanmina/SCI, Penang (04/05/2004).
37 Interview with Firm A.
more willing to take risks. The big guys, AKN, Globetronics, do have vision. The sector is comprised of 20 per cent winners and 80 per cent backyardists.\(^{38}\)

Third, despite rising unemployment in the electronics sector, both MNCs and SMEs have been affected by a shortage of skilled workers. Many multinationals are unable to find the workers with the specific competencies they need to undertake existing or potential tasks.\(^{39}\) This results in a constant, but ‘subtle’ relocation of tasks, as ‘if after a year, a company cannot find the needed personnel, they relocate that part of the process, while maintaining operations here’.\(^{40}\)

While MNCs obtain the best available local graduates, due to their higher pay, prestige and benefits, SMEs are less able to attract high-quality graduates and are forced to pay higher wages, due to their scarcity.\(^{41}\) However, this can still affect MNCs, as the scarcity of qualified labour affects the quality of services offered by local supplier firms – providing an incentive to search elsewhere for a more developed supplier base.\(^{42}\)

The shortage in labour also results in high levels of poaching.\(^{43}\) SMEs lose out, as many of their workers eventually seek work in bigger firms.\(^{44}\) This also increases employers’ reluctance to invest in training, decreasing the technological sophistication of the workforce.\(^{45}\)

As a result, Penang has not yet moved away from its reliance on low-skill, high-volume manufacturing, which places it directly in competition with a host of other low-cost

\(^{38}\) Interview with Low Swee Heong.

\(^{39}\) ‘China and Taiwan, for one [job] ad, you get 100 applications. In Malaysia for every ad, you get only 10 per cent of what you need’. Interview with E.K. Chong, former Intel Malaysia Manager, Penang (09/04/2004).

\(^{40}\) Interview with Mark Chang.

\(^{41}\) Interviews with Firm A and Firm C, Penang (12/03/2004).

\(^{42}\) ‘Agilent does not have a human resource issue, but it has an outsourcing issue, which is a different manifestation of the same problem.’ Interview with Yoon Chon Leong.

\(^{43}\) Interview with managers from SANMINA/SCI, Low Swee Heong, and Tan Seang Aun, Branch Manager, Federation of Malaysian Manufacturers, Northern Region, Penang (05/03/2004).

\(^{44}\) Interview with Jason Ban, Branch Manager, Adecco-Malaysia, Penang (30/03/2004).

\(^{45}\) Interviews with Mark Chang, Jason Ban, and Anthony Santrom, Branch Manager, Manpower, Penang, (17/03/2004).
locations. Rather, it needs to establish a ‘unique value purpose’ where there is less competition and the state’s capabilities are better leveraged.46

Thus, the business model that has driven Penang’s growth over the last 30 years is now no longer valid. If the state is to retain its electronics industry, it will have to revamp its competitive advantage, away from a reliance on labour-intensive tasks towards more sophisticated and unique activities.

**Mitigating Factors**

However, the demise of Penang’s manufacturing sector is not inevitable. Indeed, Penang-based industry observers, MNC managers, and firm owners argue that it possesses capabilities that can be built on to compete in more high value-added segments of the industry.

In the first place, Penang benefits from a certain amount of ‘path dependence’. It currently hosts a core of MNCs who have made considerable physical and human capital investments. While labour-intensive tasks may migrate to new locations, it is unlikely that MNCs will leave altogether. A business association representative states that while there is a ‘slow movement’ of lower-end manufacturing out of Penang, MNCs will seek to leverage the sunk costs already made in the state. As long as some type of profitable operation can be made in these facilities, investors will stay.47

Furthermore, it is unlikely that investors will locate all their operations in one country, as they prefer to disperse their operations to spread risk. The weight of the global economy is shifting to Asia, and Malaysia is in a good position to leverage this. Malaysia, and Penang, could serve as a good position from which to ramp up operations in China and India, countries with which it has cultural and linguistic ties.48

---

46 ‘Thailand has found its niche in automation and agriculture that is not so replicable for China. India has moved into software and design…but also traditional medicine. China is active in manufacturing. Korea is in display, electronics, and photonics. It is very good at brand management. In Penang, small and mediumly established companies are losing out. They know they need to do something but don’t quite know what.’ Interview with Venture Capitalist A, Penang (19/03/2004).
47 Interview with O.K. Lee.
48 Interview with Subramaniam Pillay.
In addition, Penang has a 35-year track record of electronics manufacturing. It is able to offer consistent levels of quality, and has proven experience in product design and machinery automation. While simple assembly will almost certainly leave, there is a window of opportunity for the state to carve out a niche for itself in machinery automation and process engineering. With adequate support, Penang could specialise in logistics, in particular supply chain management and procurement. It could also offer specialized manufacturing R&D services.

Furthermore, Penang is a favourable location for research and particularly design work because of low rates of intellectual piracy. This is not really due to a proactive government approach to the protection of intellectual property. Rather, piracy tends to occur in locations where final products are sold and can be reverse-engineered. Because Penang is not the final market, manufacturers have fewer worries about ideas and designs being stolen.

In addition, while unskilled labour is cheaper in other locations, skilled labour is favourably priced (albeit in insufficient quantities). The cost of English-speaking personnel with management experience is competitive with India and comparatively cheaper than in Singapore and China. In addition, Malaysia possesses a stock of university graduates with varied overseas qualifications, and good language skills.

Thus, Penang is facing serious challenges. New industry information shows that more labour-intensive operations are beginning to relocate to new, cheaper locations. However, interviews with industry observers show that, despite this, other tasks may remain, due to

---

49 Interview with O.K. Lee.
50 Interviews with Firm C and Venture Capitalist A.
51 Interview with Venture Capitalist A. In addition, Yoon Chon Leong argues that Penang does not compete with China and other low-cost locations. Rather, its task is to persuade companies to relocate technologically sophisticated tasks that are currently in the US.
52 'The cutting of throats is seen in the market-end, not the production-end.' Interview with Yoon Chon Leong.
53 Interviews with Danny Goon and Tajuddin Carrim.
54 China, in contrast, possesses vast quantities of skilled labour, but with excessive theoretical training and insufficient business exposure. There is also evidence that the pool of postgraduates along the Eastern Seaboard is being exhausted, prompting MNCs to move to the interior of the country. Interviews with Subramaniam Pillay and Tajuddin Carrim.
Penang’s expertise in specific niche areas, language and skill capabilities, as well as the need to diversify production locations. However, this is not certain.

Conclusions

This chapter has argued that the electronics sector in Malaysia and Penang has grown rapidly and consistently, coming to account for a significant proportion of manufacturing output, employment, and economic growth.

However, over the last ten years, the electronics industry has changed in important ways, becoming markedly more competitive. It is now characterised by increasingly rapid technological change, constantly evolving production configurations, and falling profit margins. Manufacturing has become more much mobile, barriers to entry for new firms have been raised, expectations of established firms have increased exponentially, and new low-cost competitors have entered the fray.

In this context, Malaysia and Penang’s structural shortcomings have been exposed. Malaysia, in general, has been unable to develop unique capabilities, and still seeks to compete on price as opposed to value-added. As most of its products are relatively simple electrical and consumer electronics items and its firms perform relatively basic assembly and packaging tasks, it has only had limited success in fostering industrial-technological transformation. Malaysia does not have the indigenous technological capabilities of Korea or Taiwan, nor has it specialized in providing high value-added services to MNCs like Singapore.

Relative to other production centres in Malaysia, Penang stands out as a centre of dynamism. The province has hosted a core of multinationals for more than thirty years, seen the emergence of a generation of successful supplier firms, and taken on more complex and technologically-demanding tasks. Unlike the Klang Valley or Johor Bahru, Penang has emerged as a centre of design and development in certain industry segments, notably semiconductors and electronic equipment. It also hosts specific logistics, marketing, and even R&D tasks.
Notwithstanding this, the province has also been affected by the new business environment. Bringing together new industry information, this chapter has shown that manufacturing employment in Penang is falling, investment is levelling off, and certain industry sectors have relocated altogether. While some of the state’s capabilities may retain investment in some higher value-added areas, this is by no means certain. Thus, this chapter has argued that while Penang has been more effective than other provinces at encouraging industrial-technological transformation, it, too, has not been wholly successful.

This chapter has thus provided an analysis of the electronics sector in Penang and the challenges it is currently facing. The next two chapters will seek to establish how national and state level institutions and policy frameworks influenced the development of the electronics sector, with its concomitant strengths and liabilities.

To this end, Chapter Four will assess Malaysia’s institutional regime and policies, seeking to evaluate their effectiveness for fostering economic growth and industrial upgrading. Using the same framework, Chapter Five will study Penang’s institutional context and policies, seeking to establish how, within the confines of its limited purview, its sub-national state contributed to the development of its electronics sector.
CHAPTER 4

The Malaysian State and Industrial Policy Framework

Introduction

Chapter Three provided an analysis of Penang’s electronics sector. Once a global leader for low-cost assembly, the province has moved away from relying exclusively on cheap labour and has begun to offer more sophisticated and value-added services. In the Malaysian context, Penang’s performance has been outstanding, as it has a more sophisticated local supplier base and hosts more value-added operations than other provinces.

Despite this performance, new data shows that investment has stagnated, employment levels have fallen, and labour-intensive tasks are being relocated elsewhere. While there are prospects of continued investment in certain niche areas, this is by no means certain. Therefore, while comparatively successful relative to the Malaysian average, the province has still been only partially successful at fostering industrial-technological transformation.

As the first stage in establishing the role of Penang’s institutional regime and policies in contributing to this outcome, this chapter will focus on Malaysia’s institutional and policy context through drawing on existing work to provide the necessary contextual backdrop. Following the framework set out in Chapter Two, it will gauge the national state’s capacities for fostering economic transformation through analysing the bureaucracy and its relationship with the private sector. Second, it will analyse what policies have been implemented and their ramifications for market actors. Third, it will set out the context within which Malaysia’s provincial states can manoeuvre. Where appropriate, it will make comparisons with the Indian context.

To this end, this Chapter is divided into five sections. After a brief discussion of Malaysia’s colonial experience, the subsequent three sections will analyse a specific era of the country’s recent history. Each section will adopt a Historical Institutional approach, by first examining a period’s political and institutional context, before proceeding to analyse the
policies and effects they had on the overall economy and the electronics sector. The fifth section will put forward the chapter’s conclusions and main arguments.

Colonial Malaya

The Colonization Process

The British colonization of Malaya occurred in phases, mirroring the Indian patchwork of directly administered colonies and Princely States. The Straits Settlements of Penang, Malacca, and Singapore were established as trading outposts in the late 18th and early 19th centuries, and were governed as colonies. The Federated and Unfederated Malay States were subsequently incorporated into the British Empire over the periods 1874-95 and 1909-14 respectively. In the Malay States, the pre-existing structure of the Sultanates was preserved to facilitate colonial rule and British influence was exercised through a Resident or Adviser to the Sultans (Roff 1967:30, Loh 2002:244).

Malaya’s ethnic composition changed dramatically over the course of the colonial period. The Malays, the original inhabitants of the peninsula, were mostly subsistence farmers and not attracted by the wages offered by British enterprises. Thus, Chinese and Indian labourers were brought in to work in tin mines and on rubber plantations from 1870. While migration stopped before World War II, immigrants comprised almost half of the country’s population at independence (Crouch 1996:17, Mauzy 1993:108).

The Transition to Independence

After World War II, the British began laying the groundwork for the country’s independence, creating the Malayan Union in 1946. While the Union kept the Sultanates,

---

1 The Federated States were Negeri Sembilan, Pahang, Perak, and Selangor. Partly for ease of administration, these were federated in 1896 with a capital in Kuala Lumpur. The Unfederated States were Kedah, Kelantan, Johor, Perlis, and Trengganu.

2 Singapore had not been included in the Union at this time, due to its entrepôt role and the effect that its predominantly Chinese population would have on the country’s overall ethnic composition (Means 1976:52).
the country’s sovereignty was transferred to the British Crown. This was accompanied by liberal citizenship laws that incorporated the country’s Chinese and Indians on equal terms with the Malays (Andaya and Andaya 2001:266).

The proposed Union led to the first visible manifestation of Malay ethno-nationalism. Given their relative economic marginalization and fearing the erosion of their status as the indigenous inhabitants of the country, the Union was stridently opposed by the Malays. The Sultans were appropriated as ‘symbols of Malay political sovereignty and precedence’ over other ethnic communities, and resistance was channelled through the newly-established United Malays National Organization (UMNO) (Lim 1997:18). The British gave way, creating the Federation of Malaya in 1948. This framework preserved the Sultans, kept the separate states, and had stricter citizenship laws for immigrants (Shafruddin 1988:5).

However, the federal system did not correspond with the country’s emerging political reality, as the borders of the Settlements and Sultanates did not coincide with ethnic concentrations or cultural specificities. As a result, the political parties that emerged in the run-up to independence had national, and not state-level, characters (Lim 1997:19).

The Alliance

While they did not possess great economic power, Malays had been able to gain sizeable political power during the colonial administration, in keeping with the British perception of them as the ‘legitimate rulers of the country’. The elite had, through occupying the higher levels of command, gained control of the bureaucracy, police, and military (Crouch 1996:17). UMNO emerged as this faction’s political wing and proceeded to absorb other potential mechanisms of representation.

The Malayan Chinese Association (MCA) and the Malayan Indian Congress (MIC), which represented their respective communities, were established during this period. After 1963, these were subsequently called the Malaysian Chinese Association and Malaysian Indian Congress.

3 According to the British, the Sultans, who had resisted prior attempts at unification, lost legitimacy due to their collaboration with the Japanese (Sopiee 1976:14).

4 After 1963, these were subsequently called the Malaysian Chinese Association and Malaysian Indian Congress.
ethnically-based parties formed the Alliance in 1954 and competed in elections held under British tutelage. The arrangement behind the coalition was termed ‘the Bargain’, which stipulated that Malays would retain political power and non-Malays would be allowed to keep their economic positions, tradition, and culture (Mauzy 1993:108).

The first national elections were held in 1955, with the Alliance winning on a platform of self-rule within two years. While the three parties were nominal equals, the balance of power lay with UMNO. UMNO held the offices of Prime and Deputy Prime Minister while the MCA controlled the Ministries of Finance and Trade and Industry (Funston 2001:186).

The Constitution and Structure of Government

As in India, the future governing party worked with the British to develop the structure and system of government in the run-up to independence. While UMNO had fought for the preservation of the separate states within a federal framework, it became clear that, given the country’s relatively small size and population, it would be more effectively managed by a strong central government (Lim 1997:19-20). The commission tasked with drawing up the country’s constitution was thus asked to cater for ‘the establishment of a strong central government with states and settlements enjoying a measure of autonomy’ (Shafruddin 1988:7).

Following this, the 1957 Constitution established a federal system of government. The Constitution laid out the responsibilities of each level of governance, with a list each for the federal and state governments and a concurrent list with shared responsibilities. The federal government was made responsible for public goods such as defence, internal security, external affairs, and finance, as well as services such as education, health, and transport. The states were given residual responsibilities, consisting of land, forestry, Islamic affairs,

5 UMNO and MCA formed the Alliance in 1952, and were joined by the MIC in 1954 (Means 1976:133,153).
6 The federal government is comprised of elected members of Parliament, led by a Cabinet of Ministers and headed by the Prime Minister, chosen by the majority party in the House of Representatives. The state governments are elected members of each state’s Legislative Assembly, and led by a Chief Minister chosen by the majority party. Local governments are political sub-units of the states and are subordinate to them (Anuar 2000:86).
and local government\(^7\), and the federal government was given precedence over state governments in the event of any dispute (Ninth Schedule, the Constitution of Malaysia).

This division of power was correspondingly matched by access to resources. The Constitution assigned the bulk of revenues to the federal government and established fixed formulas for the transfer of funds from the federal to the state governments. The federal government was given power to receive trade duties and levy taxes on income, companies, and capital gains. The states were given smaller, less flexible sources of income\(^8\), and barred from levying new taxes or borrowing without federal permission (Anuar 2000:87, Wee 1996:284).

While pre-colonial political boundaries influenced the structure of government in both Malaysia and India, as will be seen later on, state governments in the latter country were bestowed with a much wider range of responsibilities and sources of revenue.

**Summing Up**

Malaysia’s ethnic composition changed dramatically under British rule. In response to the large numbers of migrants and their perceived economic marginalization, an ethno-nationalistic movement emerged amongst the Malays, who appropriated the newly-created United Malays National Organisation as the institutional vehicle to articulate and defend their interests. As part of the struggle to safeguard the status of Malays, UMNO fought to preserve the Sultanates, resulting in the creation of a federal governance structure. However, given the country’s small size, the federal government was bestowed with the bulk of responsibilities and revenue, leaving state governments with residual duties and few resources.

---

\(^7\) This includes local public services such as water supply, waste collection and disposal, drainage, parks, and so forth.

\(^8\) These taxes included: revenue from land sales; natural resources such as mines and forests; an Islamic tax; and duty on entertainment.
Post-Independence (1957-1969)

The inter-ethnic elite bargaining model established before independence was buoyed by the Alliance’s successful electoral performance. The institutions of government left by the British were appropriated smoothly, and links between the main pro-independence party, UMNO, and the bureaucracy sealed. While more geared to administration than fostering industrialisation, the state attempted to promote economic diversification through import substitution. However, this approach was limited by policy failures and the limited size of the domestic market. The resulting foreign-owned, capital-intensive industrialization did not provide an answer to the country’s rising economic inequality and escalating inter-ethnic tensions.

The Political Context

At independence, Malayan society was multi-ethnic, composed of almost 50 per cent Malays and aborigines, 37 per cent Chinese, and 12 per cent Indians (Bowie 1994:27). The Alliance, through its consociational model, was able to win every election from 1955 to 1969. In the absence of a credible multi-ethnic alternative this coalition was unbeatable, as each member party drew votes from its respective community (Crouch 1996:19). However, despite the political elites’ electoral success and ‘ideological unity’, the grass-roots level was characterised by growing communalism and ethnic tension (Loh and Kahn 1992:9).

Notwithstanding the country’s relatively high income level, there were considerable income disparities – particularly between ethnic groups. While many non-Malays were poor, they were, in aggregate terms, better off than their Malay counterparts. In particular, Chinese merchants were mistakenly perceived to dominate the economy due to their roles as middlemen. Malays in rural areas began to feel that they were not benefiting proportionately from the country’s economic growth. They were frustrated with the perceived increasing Chinese domination of the economy and the UMNO-led Alliance.

Puthucheary observes that, in the 1950s, the bulk of Chinese in Malaya were wage earners, with 98 per cent of this group earning their living as subsistence producers or labourers. However, in the mid-1950s, the bulk of the economy was actually controlled by Europeans, who accounted for 65-75 per cent of export and 60-70...
which they felt was not doing enough to increase Malay ownership of the economy (Searle 1999:41).

National Elections were held in 1969, and although the Alliance had a majority and controlled most state governments, opposition parties made significant electoral inroads. Malays perceived this as a threat to their political dominance, and this culminated in the ethnic riots of 1969, with hundreds of deaths (Bowie 1994:170).

In response, Emergency Rule was declared and the Parliament and Constitution were suspended. During the 20 months that the Emergency lasted, the terms of ethnic power-sharing were reformulated. The Alliance coalition was renamed Barisan Nasional (National Front) and expanded from three to 11 parties. This improved UMNO’s power base, absorbing more elements in the political arena. UMNO also gained control of more government functions, assuming control of the key Finance and Trade & Industry portfolios (Searle 1999:43).

The Institutional Context

The State

As with India, upon withdrawing from Malaysia, the British left a relatively efficient and professional administrative bureaucracy. Despite this similarity, there were important institutional differences between the two countries.

Unlike India, which had begun to staff its state bureaucracy with locals before independence; Malaysia’s governing institutions were heavily staffed by British nationals, particularly at the highest levels. Thus, after 1957, the Alliance moved quickly to train

per cent of import trade (Puthucheary 2004:xiv,124). In contrast, in 1958, Malay participation in the economy comprised 1.5 per cent of share capital and 10 per cent of registered businesses (Bowie 1994:69).

Other ethnically-related issues contributed to heightened tensions. In 1963, the Federation was widened through the incorporation of predominantly-Chinese Singapore and the two Bornean states of Sabah and Sarawak, which were largely inhabited by Malays and indigenous groups. However, Singapore’s expulsion from the Federation in 1965, coupled with the declaration of Malay as the sole official language in 1967 caused considerable inter-ethnic friction. For more details on this issue, see Sopiee (1976:183-6).
Malaysian citizens to staff the civil service and through a quota system ensured that it became predominantly Malay (Puthucheary 1978:53).

In India, the Congress party, the country’s primary pro-independence movement, had to reconcile with the Indian Civil Service, which had been a bastion of the colonial administration. In contrast, in Malaysia, the impetus for independence came from Malays in the civil service. Thus, in the 1955 elections, a full 80 per cent of UMNO candidates were ex-civil servants. Furthermore, links between UMNO leaders and senior civil servants were strengthened by their similar backgrounds and education. This entailed a very close relationship between UMNO and the highest levels of the civil service, resulting in a ‘politicized bureaucracy’ (Puthucheary 1978:34,117, Leong 1991:268).

The Malayan civil service enjoyed great prestige and drew its ranks from the most educated in the country. That said, as with India, the civil service was geared to basic administrative tasks more than actively fostering economic growth. As a result, the technical abilities of most civil servants were rather limited. However, notwithstanding the close links between UMNO and the bureaucracy, there was relatively little corruption (Esman 1972:112).

Despite the country’s federal structure, the national state began to centralize power – to the benefit of the Alliance in general, and UMNO in particular. In 1965, local government elections were suspended. While the official reason given was tension with Indonesia over the accession of Sarawak and Sabah to the Malaysian Federation, it was more probable that the measure aimed to eliminate grass-roots support for parties outside the Alliance, who had begun to build up regional pockets of influence. Local government responsibilities were subsequently assumed by the state governments, which at that point were all securely held by Alliance parties (Ruland 1992:210-12,240).

**Policies**

At independence, the Malaysian economy was based on primary commodities. Trade revolved around tin and rubber, and these two commodities accounted for 85 per cent of exports in 1955 (Alavi 1996:29). The manufacturing sector was small and oriented to
processing primary products or consumables. The greater part of the manufacturing sector was Chinese, as foreign investment tended to be in the agricultural or services sector.\textsuperscript{11} That said, these firms were mostly small, with limited technological capabilities and low capitalisation (Drabble 2000:243).

The first policy orientation was to promote import substitution industrialisation (ISI) to diversify the economy and foster more capital-intensive and value-added activity. This was set in motion with the Pioneer Industries Ordinance in 1958. Early import substitution measures consisted of incentives such as tax holidays, setting up industrial estates, investment in key infrastructure, and tariff protection (Osman-Rani et al. 1986:4).

In contrast to other East Asian economies, the ISI project did not explicitly seek to involve local capital, as policies were available to both local and foreign capital without distinction (Jomo et al. 2003:110). However, the state also attempted to encourage Malay entrepreneurship to generate employment and reduce poverty. Thus, the Rural and Industrial Development Authority provided Malay businesspeople with access to credit as well as business-relevant training (Gomez and Jomo 1999:15).

\textbf{Outcomes}

The Malaysian economy grew strongly over 1957-70, at an average 6.4 per cent p.a. (Gomez and Jomo 1999:16). The manufacturing sector considerably expanded over the same period, coming to employ some 175,000 workers by 1970 (Department of Statistics 2004:94).

However, while the economic policies implementing during this period helped spark growth, they did not achieve the state’s other objectives of reducing poverty and inequality, or fostering local technological capabilities. In particular, it seemed that the disparities between ethnic groups were widening. While per capita income increased by more than a quarter over 1957-70, by the end of the 1960s, the mean household income for Malays was only 56 per cent that of Indians and 43 per cent that of Chinese (Crouch 1996:21).

\textsuperscript{11} Most Malays remained in the agricultural economy, and their very limited presence in the manufacturing
In addition, regardless of the growing industrial sector, the economy was still reliant on a reduced number of primary commodities for employment and export earnings. In part, this was due to oversights in the nascent industrial policy. For example, rather than fostering more value-added tasks among local entrepreneurs, the incentive structure for import substitution attracted 'suboptimal' industries from overseas that sought to benefit from protection (Osman-Rani et al. 1986:4). In addition, the incentive structure was not accompanied by sanctions or performance criteria and there was little planning, leading to over-investment in some sectors (Rasiah and Shari 2001:63, Drabble 2000:236).

The incentives did help the manufacturing sector grow rapidly, but producers soon saturated the small domestic economy. The large numbers of imports and few exports quickly made the balance of payments difficult, and rent-seeking emerged due to the high returns to protection (Jomo and Edwards 1993:21, Alavi 1996:35). And, perhaps most importantly, the country's excess labour-force was not absorbed (Kanapathy 2001:143).

That said, the policy did have some successes, including: helping the economy diversify, reducing reliance on imported goods, and contributing to economic growth (Osman-Rani et al. 1986:4). Furthermore, it is unlikely that foreign or Chinese investors would have entered the sector without some inducement (Drabble 2000:242). In addition, the beginnings of the textile and electronics industries emerged during this period (Jomo et al. 2003:110).

For their part, the affirmative action policies met with little success, as few independent Malay entrepreneurs emerged, and the Malay middle class remained small and reliant on public sector employment. Despite a variety of initiatives, Malay and other indigenous groups' ownership of the economy remained minor, at a paltry 2.5 per cent at the end of the decade (Gomez and Jomo 1999:15,19).

sector was confined to handicrafts, batik, and food processing.
Summing Up

Malaysia continued with the consociational model of governance developed in the run-up to Independence. Concurrently, close links between the state bureaucracy and the Malay party, UMNO, were developed and consolidated. While the state oversaw consistent economic growth, it was less successful at fostering local technological capacity, generating employment, and reducing poverty and inequality. Thus, the Alliance’s intra-elite bargaining and gradual approach to poverty reduction did not match the grass-roots political context. The 1969 racial riots led to a re-thinking of the country’s economic and political model.

Increasing Malay Dominance (1969-1985)

Over this next period, Malaysia’s model of inter-ethnic elite bargaining was replaced by more open Malay assertiveness. The UMNO party emerged as the locus of power, controlling access to vast amounts of state resources. The state began to intervene more aggressively in the economy not to foster economic transformation, but rather to reduce inter-ethnic income disparities and create a state-led heavy industry sector. However, in doing so, the state fell prey to rent-seeking and by-passed the dynamic Chinese business class, with negative implications for economic transformation. Declining levels of investment and a severe recession called into question the viability of redistributing the fruits of economic growth without creating it beforehand.

The Political Context

As will be seen in the chapters ahead, in contrast to the Indian state, which faced a plethora of interest groups, the Malaysian political context left no doubt as to who was the primary interest group as, after 1969, Malay political hegemony became more open and aggressive.

On one hand, it became clear that merely fostering economic growth would not address the Malay community’s demands for equal economic opportunities and ownership. On the
other, a new generation of post-independence Malay politicians came to power, as Tunku Abdul Rahman, the country’s first Prime Minister and one of the architects of the consociational model, was pressured from within UMNO to resign. The next two Prime Ministers, Tun Razak and Hussein Onn, and their supporters were more openly pro-Malay (Mauzy 1993:112).

This meant a reconfiguration of power relations within Barisan Nasional, with UMNO claiming all important cabinet positions. In turn, the Prime Minister and UMNO party President controlled access to state resources and benefits – which constituted the main incentive for other coalition partners to cooperate. Thus, other parties were relegated to peripheral positions, and the notion of a government composed of nearly equal partners was disposed of (Means 1991:20).

It was in this context that the New Economic Policy (NEP) was implemented in 1971. More a set of goals than a policy, the NEP aimed to eradicate poverty and ‘restructure society’ to achieve economic parity between the Malay and non-Malay populations. Originally set to last 20 years, it aimed to reduce poverty from 50 per cent to 20 per cent and to help Bumiputera own at least 30 per cent of corporate holdings (Mauzy 1993:122).

While before 1969, affirmative action policies encompassed access to land, government employment, and social services, with the NEP, this was extended to include the private sector. The state established a bevy of Bumiputera trust corporations and began to demand that large Chinese and foreign-owned enterprises cede equity to Malay businessmen.

Mahathir Mohamad, who had served as Education Minister and then Deputy Prime Minister, became Prime Minister upon Hussein’s death in 1981. Long an outspoken supporter of the need to increase the Malay community’s share of the economy, the first few years of Mahathir’s administration were characterised by the drive to increase

---

12 Poverty reduction was to be achieved through providing access to land, financing, education, and public amenities, and economic parity was to be attained through helping Malays and other ethnic groups move away from subsistence agriculture and increasing these communities’ share of corporate wealth (Andaya and Andaya 2001:303).

13 The category Bumiputera (sons of the soil) refers the ethnic Malay population as well as smaller indigenous groups. In practice, the terms Bumiputera and Malay are often used interchangeably.
government efficiency and foster heavy industry, albeit without substantially altering the policy directions charted by his predecessors.

The Institutional Context

The United Malays Organisation (UMNO)

With its uncontested position at head of Barisan Nasional and consequent unrivalled access to state resources, the composition of UMNO began to change. During the 1950s and 1960s, UMNO drew its national leaders from the ranks of the Malay upper classes, many of whom were civil servants. At the grass-roots level, leaders tended to be school-teachers, local officials, and landowners. However, as the NEP progressed, UMNO leaders began to be drawn from the emerging ranks of Malay professionals, as well as businessmen (Crouch 1996:37).

While UMNO drew a large measure of its legitimacy from its image as the ‘champion of the Malays’, it also garnered support through the dispensation of patronage. During the 1960s, the party was able to provide access to land and public sector employment, as well as licenses to use the country’s natural resources (Crouch 1992:27). However, with the NEP, the potential for patronage increased exponentially, as the state’s role in the economy expanded through the creation of public enterprises and the proliferation of controls on private sector activity.

In particular, the goal of creating a Bumiputera business class provided enormous scope for rent-seeking, as UMNO awarded licenses, contracts, concessions, and undervalued shares to Malay businessmen, in turn consolidating its support base and hold on power. While these opportunities were greatest at the top levels of the party, they also existed for mid-level UMNO officials and members of State Assemblies, who were often offered special commercial opportunities (Crouch 1996:39).

Until the 1980s, UMNO’s dominant position was virtually unchallenged. Changes in the party’s structure made it centralised and disciplined, and its predominance in the Malay
community limited the development of other intermediate institutions. That said, the increasing economic opportunities provided by the NEP also created competition within the party to capitalize on rent-seeking opportunities (Leong 1991:57, Lim 1997:22).

Thus, during the 1970s and early 1980s, UMNO was the centre of power in government and specific sectors of the economy. This power conferred access to resources, which were dispensed in return for support. Party cadres changed, away from traditional elites and grass-roots leaders, towards professionals and businessmen.

Chinese-based Intermediate Associations

The previous section detailed the growing links between the UMNO, the state, and the emerging Malay business class in the context of the NEP. As these links centred on the cultivation of UMNO’s support base, they did not extend to the Chinese business community.

While their interests actually expanded, the Chinese business community’s relationship with the state changed under the NEP. In addition to directly promoting Bumiputera interests through employment quotas and trustee agencies, the government directly challenged Chinese interests through demanding that Chinese businessmen cede equity in their enterprises to Malays (Jesudason 1989:129).

In spite of being a member of Barisan Nasional, the MCA was not able to effectively protect Chinese political and economic interests. The party’s subservient status within Barisan Nasional had been made evident in 1959, when it was unable to secure important concessions regarding education, language, and representation within BN (Leong 1991:145-49).  

14 Leong argues ‘From the 1960s onwards, UMNO acted as a multipurpose political organisation representing virtually every interest - social, cultural, political, economic, and religious – of the Malay population’ (1991:53). The exception to this is the Islamic party Parti Se Islam Malaysia (PAS). However, Leong argues that this should not be seen automatically as a Malay organisation, but rather an Islamic one.

15 Loh argues that, unlike in the Malay and Indian communities, politicians are not important figureheads in the Chinese community. Rather, prominent businesspeople, professionals, or religious leaders occupy these positions. In addition, the Chinese community has, over time, withdrawn from the political arena (2004a:1).
However, crucial intermediary functions were not filled by other institutions. Unlike the Malay community whose various interests are represented by UMNO, the Chinese community has a variety of institutions based on dialect, clan, or school background. Some clan or language-based organizations attempted to provide a response to the NEP, such as creating large communally-owned holding companies. However, they did not seek to establish communication with the state and were hampered by declining relevance to younger generations of Chinese (Heng 1991:142).

Similarly, business associations have not emerged to fill this space. In part, this has been due to a divide between ‘a set of politically-connected leaders and a larger constituency of small and medium sized firms, with limited faith in their organizational representation’ (Felker 1999:103). Thus, large Chinese firms that prospered under the NEP established patron-client ties with state and UMNO officials. Smaller companies with more limited resources did not have this avenue open to them.

The Federation of Malaysian Manufacturers (FMM) has emerged as a spokesperson of sorts for the manufacturing sector. Representing 75 per cent of paid-up capital in the sector, it has been proactive in addressing general policy issues (Leong 1991:101). However, its membership among SMEs is very limited, and it has been unable to mobilise its constituents to address specific issues effectively. It has also been weakened by its exclusion from state-led dialogues with the business sector (Felker 1999:103).

In response to the limited effectiveness of these institutions, well-placed Chinese entrepreneurs ceased to promote their interests through ethnically-based organisations. Heng concludes that ‘those Chinese business leaders who have attempted to carry out their

The MCA did attempt to organise its constituents to establish largely collectively owned Chinese corporations as a response to the NEP. Initially established as an MCA venture, ‘Multi-Purpose Holdings Berhad’ (MPHB) had an initial period of success. However, it suffered from having to reconcile political and economic goals, and faced considerable opposition from state agencies that regarded it as a competitor of Bumiputra trustee agencies (Heng 1992:138-9). In addition, MPHB, like its NEP counterparts, was largely concerned with speculative ventures. Due to its unsustainable debt/equity ratio, it went into decline and was eventually sold. Like MPHB, these enterprises focused on quick profit-making activities in the real estate and finance sectors, shying away from manufacturing (Sieh 1992:121). Such organisations were also constrained by their inability to transcend traditional management styles (based family-owned enterprises) and their commitments to not compete with smaller Chinese companies (who were their constituents).
enterprises in ways acceptable to Malay power brokers have achieved greater success than other businessmen and narrowly Chinese-focused institutions' (1992:142).

Thus, while UMNO and the state established links with one section of the business class, they lost channels of communication with another. In the pro-Malay climate of the NEP era, the Chinese business community found it difficult to establish or maintain dialogue with the state, opting instead to withdraw from the public domain. Specific individuals chose to establish patronage links with well-placed party officials to circumvent obstructive policies.

Policies

The policy framework changed markedly during this period. On one hand, the state began to intervene more proactively in certain sectors of the economy to redistribute wealth and claim sections of the economy for the Bumiputera community. On the other, it moved to liberalize and open other sectors to foreign direct investment.

The New Economic Policy

Under the NEP, the government departed from its ‘free-market’ philosophy and began to intervene directly in the economy, seeking to increase the share of assets under Bumiputera control. To this end, the NEP had several thrusts. They were: developing the rural economy through providing access to land and commercialising crop production; promoting manufacturing to provide employment; reducing regional income disparities; and, creating a variety of affirmative action policies (Drabble 2000:197).

These programs had limited impact during the early part of the decade. Thus, the NEP was pursued more aggressively after 1975, through the Investment Coordination Act (ICA) and the Capital Issues Committee (CIC). The ICA required all manufacturers above a certain threshold to apply for a license from the government, which was contingent on meeting
Malay equity requirements. The CIC had strictures regarding assets, mergers, acquisitions, and takeovers and was used to apply NEP equity requirements to the corporate sector (UNCTAD 2003:170).

Export-Oriented

Despite the proliferation of controls on state-owned enterprises in certain sectors, emphasis was also placed on fostering export-oriented activities. This was largely done through attracting foreign capital through agile investment promotion and targeted infrastructure provision. The 1968 Investment Incentives Act was the cornerstone of this policy focus. It offered an array of incentives, including: investment credits, tariff exemptions for inputs, tax concessions and exemption for exports, facilitated import licenses, and infrastructure (Alavi 1996:37).

This was followed by the 1971 Free Trade Zone act, which offered similar incentives but was targeted at firms investing in specific locations. The 1973 Licensed Manufacturing Warehouse programme extended many of these benefits to factories established outside the trade zones (UNCTAD 2003:136,170). The most important incentives were: ‘Pioneer’ status, which entailed a tax exemption linked to the size of the investment; and the Labour Utilization Relief Scheme, which was a tax exemption linked to the amount of workers hired (Rasiah and Ali 1998:58).

Furthermore, despite the interventionist nature of the ICA and related policies, equity requirements were often not strictly applied to foreign concerns and employment quotas for Bumiputeras were comparatively easy to fulfil (Jesudason 1989:138). 

---

17 The threshold was for firms with a turnover above RM 100,000 and/or more than 25 workers. Due to protests from both Chinese and foreign investors, the ICA was liberalised somewhat in 1977. The lowest threshold was increased to a level that excluded most small and medium enterprises. In addition, an appeals committee was created in 1979. While these measures largely pacified international investors, the Chinese business sector was not mollified. For more details, see Jesudason (1989).

18 While multinationals wanted modifications to the more intrusive policies, they essentially regarded the ICA equity requirements as a domestic policy matter. Investors were at liberty to decide whether they would accept these stipulations or not. International investors were more concerned about ‘unpredictable changes’ in
However, the new emphasis on export-oriented industries did not mean that the existing import substitution enterprises were dismantled, rather they continued to produce for the domestic market (Jomo et al. 2003:112). Tariff protection for some sectors was phased out, but was increased for others that were deemed strategic. However, there was no method for evaluating the efficiency or effectiveness of import substitution companies, and no attempt to make under-performing enterprises improve or compete on the international market (Alavi 1996:41).

Thus, the origins of Malaysia’s dualistic economy emerged at this time. Alavi states

the irony about the EOI strategy in Malaysia is that, rather than enforcing a policy to force the inefficient and uncompetitive ISIs to become efficient and internationally competitive and to produce for the export market, the new outward strategy laid stress on activities in specially established zones (1996:40).

Import Substitution Industrialisation

During the first half of the 1980s, economic policy changed tack. With regard to the export-oriented sector, the policies set out in the 1970s remained largely unchanged. Incentives, combined with Malaysia’s comparatively ‘business friendly’ environment, served to retain investors. Little effort was invested in fostering technological upgrading, and any industrial deepening that took place was the effect of a tightening labour market and competitive changes in world markets (Rasiah and Ali 1998:59).

However, regarding the more protected domestic sector, this period was marked by a return to import substitution industrialisation. As part of his ‘Look East’ policy, Mahathir sought to emulate Japan and Korea’s fostering of capital-intensive industry. The heavy industrialisation strategy sought to diversify the manufacturing sector, foster linkages with local companies, promote SMEs (particularly Malay-owned), and develop local technological capabilities through investing in R&D and forming joint ventures with foreign firms (Lall 1995:151).

the policy framework that altered their risk calculations. They were also wary of bureaucratic controls on
Greater emphasis was placed on fostering more complex industrial activities and deepening local technological capabilities (Felker and Jomo 1999:19). To this end, basic metal and engineering sectors were targeted as core technological activities and to provide skills that could then be used to foster other industries. This was undertaken by direct state action through the Heavy Industries Corporation of Malaysia (HICOM), established in 1980, whose operations included: the automobile sector, motorcycle engines, cement factories, steel and iron mills, and petrochemicals (Kanapathy 2001:144). Government assistance included low-cost financing and restriction of competing goods from overseas through tariffs or quotas. The cost of these initiatives reached RM 3.8 billion (Jomo 1997:101).

Mahathir was convinced of the capacity of state institutions to undertake technologically complex projects, and did not hold the industrial capabilities of local entrepreneurs in high regard. Thus, the state bypassed the local (Chinese) manufacturing sector, and courted foreign, primarily Japanese, capital. The idea was that state-owned institutions would replace foreign operations in sectors that were technologically simple but joint ventures would be established with foreign enterprises to secure access to technology in more complex sectors (Jesudason 1989:167).

Thus, government policies over this period served to divide the economy into a protected domestic sector and a more open, export-oriented sector. In the domestic sector, the state attempted to diffuse potential ethnic strife (and increase its support base) by creating a Bumiputera capitalist class through the creation of trust corporations, equity requirements, and an array of special initiatives. Later on, the state moved to reduce coordination externalities and foster the creation of an array of heavy industries. In the export-oriented sector, the state created investment incentives and moved to provide targeted and high quality infrastructure to attract foreign investment.

---

for foreign personnel, managerial control, or other measures that would affect the way they carried out business. 

Outcomes

The Export-Oriented Sector

The export-oriented policy regime, based on Malaysia’s attributes – such as economic and political stability, good infrastructure, and a relatively well-educated workforce – was successful in attracting new investment.

The country’s reliance on traditional commodities such as rubber and tin was reduced, as production of alternative products such as palm oil and timber was successful. However, the real effect was felt in the manufacturing sector. Manufacturing employment tripled, from 175,000 people in 1970 to 475,000 in 1985, and output increased ten-fold over the same period from RM 4.3 billion to RM 45 billion (Department of Statistics 2004:94). Electronics items became a mainstay of the manufacturing sector, as they climbed from 2.8 per cent of manufactured exports in 1970 to 47.7 per cent in 1980 and 52.1 per cent in 1985 (Kanapathy 2001:Table 5.4).

While these policy measures did contribute to the rapid expansion of the manufacturing sector in general and the electronics sector in particular, there were shortcomings. Although these new sectors represented investment and generated employment, the bulk of the manufacturing activity took place in enclaves with only limited spillover effects (Rasiah and Ali 1999:58). This meant weak linkages with local firms, particularly SMEs (Toh 1998:64). And, most of the jobs created were low-wage (Jomo and Edwards 1993:27).

Furthermore, the incentive regime and wider business climate were not geared to technology transfer. Doraisami and Rasiah argue that the incentives offered to foreign investors were too generous and not tied to industrial upgrading (2001:262). Indeed, Jomo et al. state that levels of protection for export-oriented industries surpassed those offered to most import-substituting industries (2003:113). Most types of technology were acquired through joint ventures or FDI, and agreements regarding technology transfer were seldom monitored for compliance (Rasiah 1999b:191).
The Domestic Sector

As part of the NEP, the state established an array of public enterprises and trustee agencies to acquire assets on behalf of Bumiputeras, as well as diversify the economy. The number of such enterprises mushroomed, from just over 50 in 1965 to more than 1,000 by 1985 (Table 4.1). In particular, the manufacturing and services sectors saw a dramatic increase in the number of state concerns.

In comparison to the past, the NEP began to move towards the equity targets it sought to attain. Bumiputra equity holdings increased from 1.5 per cent in 1969 to 12.5 per cent in 1980 and 18.7 per cent in 1983 (Gomez and Jomo 1999:53).

However, the commercial viability of many of these initiatives was limited. In particular, the HICOM ventures were in very competitive sectors, and needed government protection in order to survive. Buoyed by the discovery of oil on its shores, the state began to borrow heavily, with debt levels increasing from 14 per cent of GDP in 1976-80 to more than 27 per cent in 1981.

Table 4.1  The Number of Public Enterprises in Malaysia (1965-1985)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>5</td>
<td>10</td>
<td>38</td>
<td>83</td>
<td>127</td>
</tr>
<tr>
<td>Construction</td>
<td>9</td>
<td>9</td>
<td>33</td>
<td>65</td>
<td>121</td>
</tr>
<tr>
<td>Mining</td>
<td>1</td>
<td>3</td>
<td>6</td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>Finance</td>
<td>9</td>
<td>17</td>
<td>50</td>
<td>78</td>
<td>116</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>11</td>
<td>40</td>
<td>132</td>
<td>212</td>
<td>289</td>
</tr>
<tr>
<td>Services</td>
<td>6</td>
<td>13</td>
<td>76</td>
<td>148</td>
<td>258</td>
</tr>
<tr>
<td>Transport</td>
<td>13</td>
<td>17</td>
<td>27</td>
<td>45</td>
<td>63</td>
</tr>
<tr>
<td>Others</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>54</td>
<td>109</td>
<td>362</td>
<td>656</td>
<td>1010</td>
</tr>
</tbody>
</table>

Source: Gomez and Jomo (1999:31)

Furthermore, these industries suffered from: high production costs, low capacity utilisation, and weak linkages to other sectors (Jomo and Edwards 1993:29). In addition, there were no
structured attempts to monitor quality or benchmark performance and few incentives were offered for the deepening of technological capabilities (Rasiah and Shari 2001:65). That said, some difficulties were also due to the 'highly demanding' nature of these sectors (Lall 1995:155).

**Embeddedness**

One important achievement of the NEP was that it secured social peace of a kind, as the heightened tensions of 1969 faded. However, the NEP also fundamentally damaged the relationship between the state and a large segment of the private sector – namely the Chinese business community.

Chinese-Malaysian businesses were affected in a variety of ways, depending on their size. While SMEs were not directly affected by the ICA's equity requirements, they were excluded from government contracts reserved for Bumiputera concerns, and were more liable to be taken over by larger Chinese companies who now had to operate in restricted areas of the economy (Jesudason 1989:148). Thus, SME owners resorted to a number of means to circumvent the most prejudicial policies. 20

Larger companies had a different set of issues. While big companies had to restructure to incorporate Malay equity-holders, they still had to compete against Bumiputera-owned companies who benefited from NEP policies. Furthermore, new foreign investment tended to seek out Malay-owned companies in deference to the ICA, precluding possible joint ventures with Chinese investors (Jesudason 1989:152).

As a result, businessmen with sufficient resources approached government officials and politicians directly (Crouch 1996:206-211). These officials were then included on company boards, and patron-client ties established. 21 In addition, business pursuits became much

---

20 One mechanism, called 'Ali-Babaism' consisted of enlisting Bumiputeras to obtain licenses and permits on behalf of Chinese-owned enterprises in return for payment. Other companies, particularly in the manufacturing sector, split up their companies into separate units to remain below the ICA threshold (Jesudason 1989:149).

21 Crouch distinguishes between older, established entrepreneurs who enlisted patrons as a mechanism of survival and those whose ties to business pre-dated their emergence as successful entrepreneurs.
more speculative and oriented towards quick profits. Sectors requiring large investments and long gestation periods were avoided for fear of further equity requirements. Thus, banking, finance, and real estate development became the sectors of choice due to their rapid turnover.

Investment levels were affected and fell dramatically – particularly in manufacturing. Non-Bumiputera investment levels fell from 70 per cent of the total in 1970 to 30 per cent in 1972 and 13 per cent in 1979 (Jesudason 1989:143). Entrepreneurs also chose to diversify overseas, or relocate altogether.22

Thus, the state lost its channels of communication or ‘embeddedness’ with broad sections of the manufacturing sector. Jomo argues that

the ICA has failed to serve as an effective instrument of industrial policy, but has instead associated industrial policy in Malaysia with redistributive interventionism…most of the predominantly ethnic Chinese domestic private manufacturing enterprises have been wary, if not resentful of Malaysian state intervention (1997:107).

This lack of communication was not attenuated by the role of intermediate institutions. Patronage networks, the hostility of state institutions to Chinese-based associations, and the limited political options facing SMEs combined to severely curtail the potential of meaningful dialogue between the state and large sections of the manufacturing sector.

The 1985 Recession

The Malaysian economy grew well during the 1970s and the early part of the 1980s. While annual growth from 1965-69 was a respectable 6.4 per cent, from 1970-74 it climbed to 8.2 per cent and reached 8.7 per cent in 1975-79, before slowing to 6.9 per cent in 1980-84.23 However, by the mid 1980s, the economy was still profoundly dualistic with a large,

22 It is estimated that some US$ 12 billion left Malaysia during 1975-84, of which more than half was estimated to be Chinese capital (Morgan Guaranty, in Gomez and Jomo 1999:70).
unviable ISI sector and an EOI sector with little local content and value-added (Jomo 1997:107).

In 1985, Malaysia underwent a severe recession. A glut in the global semiconductor industry, coupled with climbing wages and limited value-added in the Malaysian manufacturing sector hit the economy hard. In addition, domestic investment decreased due to the NEP, and FDI fell from 5.1 per cent of GDP in 1982 to 2.2 per cent in 1985. The GDP contracted by more than one percent and manufacturing output fell (Drabble 2000:257, Jomo and Edwards 1993:33). This slump was coupled with mounting levels of international debt and the continued poor performance of HICOM enterprises.

**Summing Up**

Thus, the 1970s and early 1980s were characterized by a greater prioritization of Malay claims to an equitable distribution of wealth. Due to its unrivalled access to resources, UMNO emerged as the centre of power and patronage. Rent-seeking relationships between UMNO officials and Malay businessmen began to develop, as commercial opportunities were traded for support. Under the NEP, the state began to intervene more extensively in the economy. This was of benefit to the Malay private sector, but detrimental to the Chinese business community and, in particular, the manufacturing sector. While the largely foreign-owned export oriented sector grew quickly, it was largely labour-intensive and possessed little value-added. The uncompetitive and over-protected domestic sector, for its part, constituted a serious drain on state resources. Declining investment levels, limited productive endeavours, and unsustainable debt levels led to economic contraction.

**Policy Realism (1985-2005)**

After the economic meltdown in 1985, the Malaysian state curtailed its unequivocal pursuit of NEP goals. The heavy industry program was cut back, spending was reduced, and the bevy of state-owned enterprises began to be privatized. In addition, the state moved to

---

improve its relationship with the Chinese business class—albeit on its own terms. Aware of the limited rewards to be derived from labour-intensive operations, fostering industrial-technological transformation in the manufacturing sector became a policy priority for the first time. However, affirmative action policies continued, in particular the goal of creating a *Bumiputera* commercial and industrial class.

The Political Context

The 1987 UMNO Elections

Following the recession, tensions within UMNO emerged as resources for patronage purposes grew scarce and debates arose over the prioritisation of economic growth vis-à-vis the inter-ethnic re-distribution of wealth.

While Mahathir had long supported the need for affirmative action to enable greater Malay participation in the economy, he was concerned that the NEP had merely served to create a middle class that was dependent on state largesse. Thus, he wanted to reduce public expenditure, privatize and professionalize public sector enterprises, and de-regulate the economy (Khoo 1992:59). Regarding the NEP, Mahathir advocated a more targeted approach, oriented to creating independent Malay entrepreneurs who would spearhead the country’s drive to become a developed nation. Thus, for him, the most effective way of accomplishing this was to ‘privilege those most capable of generating further wealth’ (Gomez 2002:83).

However, other factions in UMNO favoured the continuation of NEP policies in the form of subsidies, quotas, and concessions. These factions began to attack the Mahathir administration for creating expensive and uncompetitive public enterprises, restricting the benefits of growth to a select few cronies, and an increasingly authoritarian style of governance (Means 1991:202).

These tensions became manifest in the 1987 UMNO party elections, when a group of disaffected UMNO officials contested Mahathir for leadership. Despite predictions to the contrary, Mahathir’s faction won narrowly. In the wake of the elections, he moved quickly
to consolidate his hold on power, purging UMNO and government officials who had not supported him.\textsuperscript{25} Decision-making was increasingly concentrated in the Office of the Prime Minister (OPM), and Mahathir appointed a circle of advisors drawn from outside traditional UMNO to formulate initiatives that were then passed onto state bodies for implementation (Funston 2001:175-7, Leong 1991:270).

This was accompanied by a more repressive style of governance, with fewer guarantees of individual rights. The judiciary lost independence, and laws such as the Internal Security Act were used to silence dissent, eliminating what were once checks on the executive’s power. There has also been a ‘deinstitutionalisation’ of democratic practices, seen through the disregard for established rules and procedures associated with the constitution, legislature, legal system, civil service, and elections (Mauzy 1993:117-122).

The 1997 Financial Crisis

The 1997 Financial Crisis and ensuing recessions had profound implications for Malaysia’s political context, as they called Mahathir’s elite-led economic model into question. In addition, he faced further criticism for attempting to bail out a raft of companies headed by the new \textit{Bumiputera} capitalists and wresting economic policy-making power from his Deputy Prime Minister, Anwar Ibrahim\textsuperscript{26}, to place it under control of a former ally and alleged ‘crony’, Daim Zainuddin (Gomez and Jomo 1999:189).

A reform movement comprised of Islamists, social activists, and socialists coalesced into a coalition of opposition parties that contested the 1999 elections. In spite of the controversy surrounding the Financial Crisis and the Anwar affair, Barisan Nasional was able to

\textsuperscript{25} This led to the creation of a break-away UMNO faction, which contested the 1990 elections at the head of an alternative coalition. Due in part to its control of patronage mechanisms, Mahathir’s UMNO faction won convincingly, and the break-away faction was eventually re-absorbed. See Khoo (1992:73-74) and Crouch (1996:114-30).

\textsuperscript{26} Anwar was able to project himself as a critic of pervasive corruption in government, in addition to garnering support for other issues such as democracy and governmental accountability. In the face of a growing protest movement comprised of NGOs, opposition parties, and disaffected Malays, Anwar was subsequently tried and jailed for a variety of questionable charges, including obstruction of justice and sexual misconduct (Gomez 2002:106, EIU 2005c:6).
preserve a two-thirds majority in Parliament. However, UMNO lost considerable support in the predominantly north-eastern Malay states.

The Post-Mahathir Era

After 22 years in power, Mahathir stepped down in 2003. Following tradition, leadership of UMNO, and hence the Prime Ministership, was passed to the Deputy UMNO President, Abdullah Badawi. Badawi’s accession to power heralded a change in approach. Characterised by a low-key and consensual manner, Badawi has stressed the need for good governance and equitable economic development. In the 2004 election campaign, he pledged to fight corruption, reduce poverty, and foster a more moderate and tolerant version of Islam. Badawi was vindicated by strong support for UMNO, including in the Malay heartland states (Welsh 2005:154-7, Gomez 2006:80).

However, the possibilities of change are bounded by the legacy of ‘Mahathirism’, which includes an excessive reliance on the executive, under-developed political institutions, and pervasive patronage networks (Loh 2004b:4). Furthermore, Badawi’s non-conflictual style and team of young advisors have contributed to an impression that he is weak and inconsistent. In addition, he must contend with rivals and moderate levels of support within his party (Welsh 2005:154-5). These factors have acted as a brake, and he has had to curb attempts to reduce corruption and cut back affirmative action policies (EIU 2005c:6-7).

Notwithstanding this, there have been important structural changes in Malaysia’s domestic political context. Bumiputera are now the undisputed dominant ethnic group, comprising some 65 per cent of the population. There has been progress towards the NEP goals, as poverty has been significantly reduced, there are growing ranks of Malay professionals, and Malay ownership of the economy has increased.27

With these gains, the government has become more relaxed and accommodating of minority demands regarding cultural, religious, and educational issues. Furthermore, the
popularity of PAS and certain UMNO factions among rural Malays has meant that Barisan Nasional now has to court non-Malay votes. Thus, official discourse on Malay issues is softening, and national-level policies now refer to a Malaysian identity that goes beyond ethnicity (Gomez and Jomo 1999:170, Ooi 2006:50).

**Summing Up**

Under Mahathir, the scope of the NEP was reduced and targeted towards a select group of industrialists. This occasioned unprecedented strife within the party, as an array of UMNO members favoured an expansion in affirmative action policies. This discord resulted in greater authoritarianism and centralization of power, as Mahathir sought to fend off challenges to his rule. The fall-out from the 1997 Crisis weakened, but did not destroy Mahathir’s legitimacy, and subsequent economic growth partially restored his standing. The transfer of leadership to Badawi was accompanied by a more low-key style of governance and political developments herald potentially more harmonious inter-ethnic relations. That said, there are still powerful interests within UMNO that favour more emphasis on NEP-style policies.

**The Institutional Context**

**Federal-State Government Responsibilities**

The increasing centralization of power in the executive during the Mahathir era was also reflected at the provincial level, as state governments lost financial and political autonomy.

As mentioned, the Constitution apportions the greater part of government functions and fiscal resources to the federal government. Since 1963, federal government revenue has represented some 77-91 per cent of total government revenue. However, federal government dominance is now almost total with regard to developmental expenditure. During 1985-99, federal government development expenditure was 4.5 times the

---

27 However, increasing the Malay share of the economy has come at the expense of foreign interests but not other local ethnic groups, as Chinese ownership of the economy has actually grown under the NEP (Gomez
expenditure of all state governments put together (Jomo and Wee 2003:445). Thus, even at the provincial level, the federal government is the *de facto* developmental agency.

In addition, state governments have had to cope with insufficient income to cover their responsibilities as, during the 1990s, revenues only amounted to about 80 per cent of state expenditure (Anuar 2000:88). This imbalance in access to resources has further concentrated power at the federal level, as state governments are now dependent on transfers from the federal government to remain solvent. Over time, transfers to state governments have increasingly consisted of loans rather than grants – which come with conditions. For their part, state governments have responded by reducing their expenditure and transferring some responsibilities back to the federal government.  

There are established mechanisms for transfers from the federal to state governments, and these take into account factors such as the state’s revenue generating capacities and income level (Anuar 2000:88). However, transfers are decided by the National Finance Committee, which is composed of the Prime Minister, his appointed Ministers, and a representative from each state. The Prime Minister has *de facto* control of the Committee due to his appointment of the Ministers and, in any case, the Committee’s resolutions are not binding (Wee 1996:282). Thus, states that have fallen to the opposition have experienced reductions in federal spending and transfers.  

Therefore, the Malaysian state’s centralizing tendency has continued over time, as the federal government is now the prime investment agency even at the provincial level. Furthermore, in addition to having few responsibilities and independent sources of revenue, state governments are now dependent on the federal government for loans to remain financially viable.

---

28 One notable example is water provision. While this service has traditionally been a revenue-earner, many states unable to make the necessary expensive infrastructural outlays have opted for relinquishing this responsibility. Interview with Chet Singh, former General Manager, Penang Development Corporation (1971-1991), Penang (09/02/2004).

29 The federal government can, within constitutionally set limits, also affect state governments’ revenue bases. For example, while states receive a portion of the income from oil deposits within their territory, the federal government can direct where Petronas, a state-owned company, drills for oil (Jomo and Wee 2003:445). Or, rather than using state government machinery, the federal government has, on occasion, opted to create parallel bureaucracies in opposition-ruled states to retain control. Interview with Francis Loh, Professor, School of Social Sciences, Universiti Sains Malaysia, Penang (20/02/2004).
The Political-Bureaucratic Nexus

The previous section detailed how links developed between UMNO officials and businessmen who sought to benefit from commercial opportunities arising from the NEP. During the Mahathir era, this tendency became more pronounced, as state policy sought to cultivate a group of predominantly Malay capitalists, which Mahathir saw as necessary for Malaysia's emergence as a developed nation (Gomez 2006:74).

This interpretation of the NEP involved a change in state policy, away from the institutionalized creation and re-distribution of rents to an entire community towards a personalized channelling of such rents to a select group of individuals - enabled by the state's high degree of centralization around the executive. Given the national emphasis on privatisation, patronage links often took the form of state-subsidized loans to acquire assets, licenses, and concessions (Jomo and Gomez 2000:282,296).

Given the overlap between UMNO and the state, the political channelling of rents to a few businessmen led to the creation of a 'political-bureaucratic' nexus, comprised of UMNO officials, high-level bureaucrats, and a select group of businessmen. Patron-client relationships, the purchase of party posts, and the creation of party-owned enterprises blurred 'the distinction between corporate and political power' (Gomez and Jomo 1999:5).

While not uniformly dependent on the state, it would appear that most of these businessmen were reliant to some extent on personalistic connections with the UMNO elite (Jomo and Gomez 2000:282, 296). While the greater part of the business elite that emerged as a result of these policies was Malay, there have been Chinese and Indian beneficiaries. Individual non-Bumiputera entrepreneurs have prospered in the post-NEP era, due to their

30 Searle has a slightly different analysis of the NEP-created capitalist class. While conceding that there has been extensive rent-seeking, he argues that these policies are giving rise to productive entrepreneurs. He states that 'it is no longer so easy to distinguish between rent-seeking and true productive capitalism' (1999:xvi). Searle agrees that the expansion of the state, under the guise of the NEP, served as a mechanism of accumulation for the UMNO party elite. However, he argues that the Malay business class is actually diverse and comprised of a variety of groups – each with its own relationship to the state. Furthermore, this situation is dynamic and changes over time.
successful cultivation of contacts within the UMNO elite and the state’s need to
demonstrate some degree of opportunity for other ethnic groups (Jomo and Gomez

Thus, the ‘embeddedness’ between the state and the private sector exceeded desirable
levels and was compromised. However, it is not evident that the state was captured and lost
all autonomy. Bowie (1994), Felker (1998), and Felker with Jomo (1999) argue that the
state still retained a fair degree of independence from, and power over, rent-seeking
elements. Bowie states, for example, that

The existence of these personal ties indicates that policy makers in Malaysia are by
no means completely insulated from business. Business, however, is clearly the client
in this hierarchical structure: the Malay political elite controlling the state apparatus
holds most of the cards (1994:189).

Thus, during the Mahathir era, a political-bureaucratic nexus comprised of high-level
UMNO and state officials as well as a select group of businessmen emerged. This nexus
concentrated on protected and essentially speculative sectors of the economy.

Business Associations

The 1985 recession, coupled with the evident unsustainability of the state-led incursion into
heavy industry, showed the state’s inability to foster industrialization without significant
private sector input. The state was placed in a quandary having, as Drabble says, to ‘choose
to continue with redistribution or foster growth again in the economy’ (2000:202).

In spite of the growth of the political-bureaucratic nexus, the relationship between the state
and Chinese business community changed after 1985, becoming markedly less antagonistic.
The ethnic tenor of economic policy was downplayed and the state took the highly
symbolic steps of relaxing ICA strictures on Malay equity and replacing highly-ranked
Bumiputera managers of ailing state enterprises with non-Malays (Felker 1998:92).
Furthermore, the state attempted a rapprochement with the Chinese business community, through the institutionalisation of consultation mechanisms with the private sector to encourage more domestic investment and solicit industry-related information for policy formulation. However, the state was particularly careful to avoid strengthening existing intermediary institutions that represented Chinese interests. Thus, the Associated Chinese Chambers of Commerce (ACCCIM) and even the multi-racial Federation of Malaysian Manufacturers were not included in state-private sector dialogues.

Therefore, the state’s response was, rather than working with established and legitimate associations, to create its own institutions. To this end, a number of high-profile organisations were created to provide formal channels of communication with industrialists. In 1991, the state set up the Malaysian Business Council (MBC). The Council was comprised of ten cabinet members, ten senior civil servants, and 47 prominent industrialists. The private sector members were handpicked and did not represent any collective private sector entities.

The Malaysian Industry-Government Group on High Technology (MIGHT) was charged with pinpointing strategic opportunities for the manufacturing sector and consulting top business leaders. However, neither of these groups had representatives from established business associations (Doraisami and Rasiah 1999:250, Felker 1999:111).

To date, these groups have been of limited utility. While the MBC served as a forum for discussing general issues such as taxation and investment, it was unable to provide more in-depth information regarding issues such as human resources, industrial upgrading, or technological deepening. This is mirrored in bodies like MIGHT. Suffering from a lack of adequate industry information, it devotes its attention to monitoring the development of new technologies overseas rather than the more ‘mundane technological tasks of productivity upgrading and technology import, absorption and diffusion confronting much of the existing manufacturing industries’ (Felker 1998:99).

31 This change is perhaps best summarized by Gomez, who states ‘the importance of Chinese – and foreign – capital for sustaining growth and promoting industrialisation became evident to the government after the severe mid-1980s recession. Mahathir’s desire to industrialise Malaysia and his recognition of the potential Chinese contribution to achieve this goal led to economic liberalisation and the inclusion of Chinese capital in his development aspirations: albeit on his terms’ (2002:5).
These shortcomings are a direct result of the personalistic nature of these bodies and the circumvention of established intermediaries. Felker states that

The government was frustrated by inability of private sector representatives to provide comprehensive and detailed industry-level information to guide policy-making, as well as their inability to mobilize large networks of producers to respond to government initiatives and incentives (1998: 94).

In addition to their limited effectiveness, the establishment of such state-driven and controlled bodies has potentially crowded out more representative and genuine forms of collaboration. Moreover, with the concentration of power for policy formulation and allocation of incentives in such centralized bodies, there are fewer incentives and tools for other public agencies and business associations to collaborate.

Therefore, while the state was aware of the need for Chinese expertise and capital in order to re-start the economy and foster more sophisticated ventures, it was unwilling to legitimize or strengthen existing intermediate institutions – rather, the state created its own. Thus, while the state began to roll back its controls on the economy and lift the restrictions on Chinese business, its bid to foster greater embeddedness to access information and capital was unsuccessful.

Policies

During this period, the industrial policy framework moved in a positive direction, as emphasis moved away from merely attracting investment and fostering job creation to seeking high value-added investment and technological deepening. However, its effectiveness was constrained by the state’s often-competing goals of fostering economic transformation and cultivating a class of predominantly Bumiputera entrepreneurs as well as the legacy of mistrust between the state and the majority of Chinese-owned manufacturing firms.
The Creation of a *Bumiputera* Commercial and Industrial Community

After 1985, the state’s role in the economy was reduced through privatisation of state-owned corporations, relaxation of strictures regarding *Bumiputera* equity, and curtailing subsidies to *Bumiputera* firms. By the early 1990s, state-led operations in the industrial sector were restricted to ‘politically sensitive’ activities in the auto manufacturing, petrochemical, iron, and steel sectors (Athukorala 2002:9). However, the state still continued with its drive to create a *Bumiputera* commercial and industrial community.

As mentioned above, a nexus developed linking state and UMNO officials with well-placed businessmen to profit from the new drive to privatize state-owned assets. In most cases, privatization was carried out by divesting public sector enterprises, although it also consisted of contracting out service provision, awarding licenses and concessions to enter a new sector, or a variety of ‘build-operate’ mechanisms.

Privatisation embraced wide swathes of the economy, including the infrastructure, transport, telecommunications, leisure, and industrial sectors, and embraced high-profile national corporations such as Malaysian Airlines, HICOM, the Malaysian International Shipping Corporation, and various subsidiaries of Petronas (Gomez and Jomo 1999:84).

In practice, shares, concessions, licenses and government contracts were not awarded competitively, but rather in an opaque and personalistic fashion and often with substantial discounts. The rationale was that only a select number of *Bumiputera* businessmen had acquired the necessary skills and experience to successfully operate large enterprises (Gomez and Jomo 1999:83-90, Jomo and Gomez 2000:295).

However, this state support was not contingent on performance, nor was it directed to the most technologically-promising sectors of the economy. Rather, Gomez and Jomo state

---

32 Malaysia’s privatisation drive was officially launched in 1983 but was limited to two infrastructure projects. Privatisation was pursued in earnest after 1985, with the sale, public listing, and leasing of public sector enterprises (Gomez and Jomo 1999:84).
most politically connected businessmen have tended to concentrate their rent-appropriating activities in the relatively protected import-substituting manufacturing, services, and other non-tradables such as real property, construction and infrastructure, while others have gained mostly from often complex paper-shuffling, asset-stripping and other similar corporate manoeuvres (1999:179).

Most of these conglomerates have thus grown through corporate takeovers and restructuring, rather than through increased productivity. In addition, rather fostering more entrepreneurs, it has led to a growing concentration of ownership. Furthermore, following the 1997 Crisis, extensive state resources were used to bail out many of these non-performing and highly-indebted corporations (Gomez 2002:101).

That said, in spite of this policy thrust, the industrial policy framework evolved positively in other areas. The heightened importance now attached to industrial-technological upgrading – or transformation – was evinced by the development of two strategic plans for the industrial sector. The plans listed priority sectors for investment and were accompanied by policy measures to encourage MNCs to locate more sophisticated tasks in Malaysia and foster linkages with the local economy.33

**Investment Promotion**

The new policy focus on upgrading and value-added activities was accompanied by vigorous investment promotion measures. The Promotion of Investment Act (PIA) was passed in 1986, which provided incentives for investment in targeted industries, abolished incentives for labour-intensive investments, and de-linked tax exemptions from the size of the capital investment. Instead, tax incentives were given for exports and expenditure on

33 The Industrial Master Plan (IMP), spanning 1986-1995, was the first in-depth sectoral analysis of the economy. The Plan recognized that the import-substitution sector was not competitive and that the export-oriented sector was not sufficiently diversified. It also pinpointed weak local technological capacities, insufficient numbers of skilled workers, and a lack of incentives to export as important threats to future growth (Drabble 2000:257). The Second Industrial Master Plan, spanning 1996-2005, again highlighted the need to diversify the manufacturing sector and deepen local industrial capabilities. The Plan stressed a move away from assembly-based manufacturing towards a more integrated approach encompassing skill-based manufacturing accompanied by supporting services. It aimed to promote the development of high value-added ‘clusters’ in key areas, accompanied by services such as R&D and design at one end of the value chain, and packaging, distribution, and marketing at the other (Kanapathy 2001:158-60, UNCTAD 2003:138).
training and R&D, and extended to local supplier firms for the first time. Furthermore, amendments were made to the ICA, which effectively excluded almost all SMEs from Bumiputera equity requirements and allowed 100 per cent foreign equity for firms exporting 80 per cent of output. In addition, all investment related matters were centralized in one agency, the Malaysian Industrial Development Authority (UNCTAD 2003:171, Rasiah and Ali 1998:58).

While investment targets were quickly met, efforts to foster local technological deepening were not as successful. In response, authorities did not filter out labour-intensive investments or adopt a firmer position vis-à-vis MNCs. Rather, they adopted a ‘positive selection’ approach, which entailed soliciting high-tech investment overseas, providing new incentives for more value-added tasks, providing specialized infrastructure, and applying informal pressure on MNCs to upgrade their operations (Felker 2001:145).

After 1990, these changes were accompanied by further adjustments to the incentive regime. Tax incentives were altered to discourage labour-intensive investment and encourage high-tech production. A 30 per cent local content condition was included in 1991, and tax exemptions for most sectors were reduced to 60 per cent from 100 per cent. However, ‘high-tech’ sectors like computers, biotechnology, automation, and wafer fabrication retained their full tax exemptions. Incentives were also offered to MNCs to set up regional headquarters and procurement centres in the country. And, minimum levels of capital investment per employee were specified in 1995 (Rasiah and Shari 2001:66, Felker 2001:146).

While the Malaysian Government often resorted to exhorting foreign investors to increase the sophistication of their operations, the uncertain power relationship vis-à-vis MNCs tempered their drive. In addition, the 1997 Financial Crisis prompted the government to loosen restrictions on investment, such as local content and minimum investment levels (Felker and Jomo 2003:99).
Targeted Infrastructure Provision

The government also moved to provide targeted high-quality infrastructure to cater to high-end industries. Thus, the first high-tech park was established in 1988 near Kuala Lumpur for IT and software firms. In addition to an array of incentives, the park had various communal facilities for higher-end tasks, such as a testing centre, labs for advanced materials, and a training centre for design and automation technology.

Two bigger and more ambitious parks were established in 1996. The Kulim High-technology Park in Kedah is the second largest in Asia and focuses on electronics, semiconductors, photonics, and biotechnology. The Park aims to provide an integrated environment for research and technology-intensive tasks, with facilities such as a business incubator, training centre, specialised infrastructure, and designated lots for supplier firms (Tajuddin 2005:6). However, as the next chapter will argue, rather than attracting new investment the Park has attracted many of its clients from nearby Penang.

This was complemented by the Multimedia Super Corridor (MSC), costing some RM 4 billion. This 15 by 50 km strip of land near Kuala Lumpur was created to house IT, multimedia, and software companies and to transform Malaysia into a world-class information technology hub. It has specialised infrastructure, universities, research facilities, exemption from quota and equity requirements, and grants and venture capital funds (Kanapathy 2001:153). By 2004, the MSC housed some 1,000 firms, most of which were Malaysian SMEs seeking to capitalise on the incentives.34 However, the MSC has generated relatively little interest from MNCs or spillovers for the wider economy (FEER 16/03/2000). In 2003, MSC status and incentives were extended to regions outside the Super Corridor in an attempt to foster investment from MNCs in other parts of the country.

It should be noted that despite Penang’s dynamic electronics industry, none of the state-owned high technology parks were located in that state. The next chapter will explore this issue in more depth.

Access to Finance

The state also moved to provide access to capital for firms seeking to upgrade their operations. In 1989, the Industrial Technical Assistance Fund was established to provide incentives for SMEs seeking to invest in new products. The Fund offered matching grants for feasibility studies, market research, and product development and design projects. That said, the Fund was not particularly popular among SMEs, only disbursing some US$ 14 million up to 2000 (Tham and Ragayah 2006:200).

The Government also set up specialised institutions to provide venture capital for technology-intensive sectors. The Malaysian Technology Development Corporation (MTDC) was set up in 1993, with a mandate to provide venture capital to public sector research institutes seeking to commercialise their products. This was limited by the dearth of commercially-viable research and, instead, the Corporation turned to providing investment capital for established companies seeking to list themselves on the stock exchange. Thus, by 1999, the MTDC was financing 26 companies in the IT, electronics, and biotechnology sectors (Felker 2003:150).

The Ministry of Finance set up its own investment arm, Khazanah Holdings, to provide seed and venture capital for similar ventures. By 1999, it had invested in some 33 public and private sector ventures, including the national car industry, some start-ups, and a wafer fabrication plant in Kulim High Technology Park. However, the MTDC and Khazanah face demands for investment in high priority sectors and have only had limited success at financing successful ventures - particularly among SMEs (Felker and Jomo 2003:102).

By 1999, Malaysia had some 30 venture capital funds, which invested some US$ 190 million in the manufacturing sector. They have provided capital for acquisition, buy-outs, and bridging financing. However, these funds have been risk-averse, providing very little as seed capital for promising enterprises (Tham and Ragayah 2006:217).

35 By 1999, the MTDC’s two grant funds had disbursed US$ 1.4 and US$ 4.8 million respectively (Tham and Ragayah 2006:2000).
R&D funding

In spite of the state’s considerable investment on infrastructure and incentives, it has traditionally under-invested in research and development. In 2000, Malaysia only spent 0.4 per cent of its gross national income on R&D, compared to Japan’s 2.8 per cent, Korea’s 2.7 per cent and Taiwan’s 2.1 per cent (World Economic Forum 2002:582).

In addition, there are questions as to whether R&D expenditure is appropriately targeted. At present, government funding is oriented to academic research, rather than private sector-led industry-specific research. Virtually all state-funded research is carried out in public institutions and there is almost no funding for private sector R&D. Furthermore, there is little contact between private firms and universities.36

While there are some tax incentives for firms to carry out R&D, the specifications are unclear, leaving it in doubt whether industry-specific process improvements qualify (Kondo 1999: 199-205). As a result, there has been little take-up of the incentives on offer, amounting to a total of US$ 36 million by 1999 (Tham and Ragayah 2006:199). Furthermore, SMEs seeking to adapt research findings for commercial use do not have recourse to funding, as grants only cover the research component of projects and not adaptation for end-use (Thiruchelvam 1999:222). Other reasons include a reluctance to reveal confidential material to government agencies (UNCTAD 2003:155).

Reducing Information and Coordination Externalities

The state also moved to reduce information and communication externalities for local firms in the auto and electronics sectors through matchmaking them with MNCs. The Ministry of International Trade and Industry (MITI) thus established the Vendor Development

---

36 Universities have focused more on teaching tasks rather than research. To date, research efforts, particularly in areas relating to engineering and applied science have not been good. Until recently, the internal culture of public universities was bureaucratic, with few incentives for faculty to establish links or contact with firms in the private sector. It was not possible for academic staff to raise revenue through projects with firms, and they had restrictions on consulting activities. Conversely, firm owners had low opinions of university staff’s ability to tackle practical problems (Felker 1999:106). Over 2000-2005, US$ 18 million in grants were approved for supporting R&D in the public sector (Tham and Ragayah 2006:199).
Programme in 1993 and was directly involved in screening potential firms, compiling a
directory, monitoring progress, and providing a range of support services (Kanapathy

The initiative met with some success, as two years later, 45 MNCs and nine large domestic
firms had signed up. However, there was confusion regarding the importance attached to
the ethnicity of firm owners, as existing (mainly Chinese-owned) suppliers were excluded
from the initiative and MITI’s list of recommended firms was almost entirely comprised of
Bumiputera-owned firms. Thus, many MNCs disregarded MITI’s list of recommended
firms and continued to work with their current suppliers. Furthermore, the supporting
agencies did not have the requisite technical knowledge to supervise operations adequately,
nor were the responsibilities of MNCs clearly established (Felker 2001:159).

In addition to matchmaking, specialist bodies were established to provide local firms with
access to industry-relevant technical information. The Standards and Industrial Research
Institute of Malaysia (SIRIM) provides contract R&D for the industrial sector as well as
help with ISO certification, training on quality management, and an array of measurement
and calibration services. The Malaysian Institute of Microelectronic Systems (MIMOS)
provides research facilities for the ICT and microelectronics sector and also possesses
facilities to pilot test new circuit designs (Felker and Jomo 2003:101).

In 1996, the state also moved to streamline support services for SMEs through
concentrating information and facilitation services in a single agency, SMIDEC. Despite
the creation of this agency, there are some 13 ministries with up to 30 agencies providing
different varieties of support – however, their presence on the ground is ‘limited and
fragmented’ (Abdullah 1999:iv,xiv,182). SMES are, in general, unaware of the framework
of support services available to them. Surveys conducted in different parts of the country
find that the majority of SMEs have not received any form of governmental assistance, and
do not know the range of services available (Narayanan 2003:4, Grunsven 2000:60-3,

SME programs in Malaysia also have a history of being geared exclusively to Bumiputera
entrepreneurs. These government-supported SMEs have not been particularly successful,
due to their owners’ lack of entrepreneurial experience and production for saturated markets (Abdullah 1999:182, Rasiah 1999b:193). This perception, heightened by measures such as the ICA, has meant that many non-Bumiputera-owned companies are hesitant to use government-provided support services (JICA 2001:3-32, Grunsven 2000:63, Abdullah 2000:66).

This perception does have merit, but government policies are becoming more inclusive. Measures such as incentives for R&D have been widened to include non-Bumiputera SMEs, and other programs such as the Human Resource Development Fund are open to all firms. Felker states

the legacy of the inter-ethnic restructuring goals, which long dominated SMI assistance programs has made many ethnic-Chinese manufacturers reluctant to participate in assistance programmes for fear of increased exposure to regulatory and tax authorities. Many local manufacturers view bureaucratic discretion in SMI promotion as either linked to Bumiputera promotion or political patronage (1998:121).

Skills Provision

As investment and employment levels in the manufacturing sector increased, the labour market tightened and skill shortages emerged. Tax incentives were offered to firms for in-house training in 1986, and the Human Resource Development Fund was created in 1993. Firms above a certain threshold were required to contribute the equivalent of 1 per cent of their payrolls, which would be reimbursed for expenditures on in-house training (Doraisami and Rasiah 1999:250). By 1997, some 530,000 people had been trained and RM 99 million invested (Ritchie 2005:751). That said, there are high levels of non-compliance as many firms under-declare the number of employees, and many do not use or seek reimbursement (World Bank 1997:110).

In addition, while the Malaysian education system has universalised access to secondary education, its tertiary education sector is small and does not produce enough graduates with
technical skills. In 1998, the tertiary enrolment rate was 11.4 per cent, in comparison with 30 per cent in Thailand, 44 per cent in Singapore, and 68 per cent in Korea (World Economic Forum 2002:584). Thus, the country's stock of scientists and engineers is considerably smaller than other Asian nations. In 1998, Malaysia had a mere 159 scientists and engineers per million people, as opposed to Taiwan's 2,980 and Korea's 2,319 (Ritchie 2005:753). 37

Furthermore, the university education system has also been affected by the imposition of quotas in line with the NEP. Until 2002, 55 per cent of all university places were reserved for Bumiputera students. This lowered the quality of many students entering university, increased drop-out rates for more difficult courses, and prompted many able students to study overseas (Lee 2004:87).

However, the state has moved to expand the tertiary education sector substantially. From 1990 to 2004, the number of polytechnics increased from seven to 11 and the number of universities from seven to 18 (Lee 2006:233). Due to the increasingly tight labour market, the private provision of education was liberalized in 1996. Thus, the number of private colleges expanded from 156 in 1992 to 600 in 2000. By 2001, twelve private universities, which had previously not been allowed to operate, were established (Lee 2004:21).

Summing Up

After 1985, the state retreated from extensive market intervention. Industrial-technological transformation became a priority for the first time, and the state moved to introduce a variety of market-complementing measures. Specialised infrastructure and incentives were offered to attract FDI and, in the case of the latter, attempts were made to link them to more value-added tasks. In addition, the state attempted to provide some institutional support for firms through reducing information and coordination externalities and providing funds for R&D and enterprise development. These measures were of utility to provinces seeking to foster their manufacturing sectors. However, the quality of these initiatives was affected by

37 This has been aggravated by unclear migration policies regarding skilled workers. It is a frequent complaint that bureaucratic hurdles restrict the hiring of foreign skilled workers (Lucas and Verry 1999:48).
the lack of industry-relevant information and the legacy of mistrust between the state and many SMEs. This state of affairs was particularly marked in Penang, given its cultural and political specificity.

Outcomes

Notwithstanding the 1985 and 1998 recessions, the Malaysian economy continued its strong performance, growing at an average 7.1 per cent and 5.2 per cent between 1985-94 and 1995-2004 respectively. When viewed over a longer period of time, the economy's performance is even more impressive, growing consistently until the early 1980s, before contracting slightly and growing even more quickly after that (Diagram 4.1). While the 1998 recession was serious, growth did resume - albeit at a less aggressive pace.

Diagram 4.1

![GDP per capita (1965-2004)](chart)

Source: WDI Online

Over time, the country became more dependent on the export of goods and services, which also grew quickly. As a percentage of GDP, exports have grown from some 40 per cent in the 1960s to approximately 120 per cent after 2000, due to the country’s manufacturing success as well as a high dependence on imports. As with GDP, exports grew more quickly.

---

after the mid-1980s, rising from approximately 50 per cent of GDP to more than 100 per cent after 1998 (Diagram 4.2).

Diagram 4.2

![Exports of goods and services (1965-2004)](Image)

Source: WDI Online

Thus, the manufacturing sector has expanded considerably, growing from under 10 percent of GDP in 1965 to 19 percent in 1985 and 31 percent in 2004. It now employs just under a third of the country’s labour force and accounts for 85% of export earnings (EIU 2005:20,42).

However, as argued in Chapter Three, the manufacturing sector has narrowed and become dependent on a limited number of exports. The electronics sector has expanded continuously and now represents 70 per cent of the country’s manufactured exports. In addition, the electronics sector is predominantly foreign-owned, with FDI accounting for some 84 per cent of investment in the sector in 2000 (Tham and Ragayah 2006:208).

---

Mahathir’s drive to foster a class of Bumiputera entrepreneurs did not succeed, particularly in the industrial sector. Of the top ten firms on the Malaysian stock exchange, three are Chinese and the other seven are state-owned enterprises. Of the country’s top 20 firms, only two are involved in industry. One is the state-owned manufacturer, Proton, and the other is a foreign-owned corporation, Rothman’s. Many once highly-visible Bumiputera firms such as Malaysian Airlines and Celcom had to be nationalized in the wake of the 1997 Crisis (Gomez 2006:77).

Diagram 4.3

On the other hand, the drive by the Malaysian government to attract more FDI was, by and large, successful during the late 1980s and early 1990s. Foreign direct investment as a percentage of GDP expanded quickly from under 2 per cent in 1987 to almost 9 per cent in 1992 (Diagram 4.3). While decreasing after this peak, it stayed at around 5 per cent for the

---

Table 4.2  Electronics Exports as a Percentage of Manufactured Exports
(1968-2004)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronics</td>
<td>0.7</td>
<td>2.1</td>
<td>32.8</td>
<td>51.4</td>
<td>50.5</td>
<td>67.5</td>
<td>65.8</td>
</tr>
</tbody>
</table>


---

41 Source: WDI Online
rest of the decade. Furthermore, attempts to woo more sophisticated investments from MNCs were moderately successful and by 1999, there were 45 new regional headquarters, 39 international procurement centres, and some 22 'high technology' status projects (Felker and Jomo 2003:104).

However, since 1999, investment has begun to decrease in absolute and relative terms. This is more meaningful when compared to Malaysia's other competitors (Table 4.3). Malaysia is placed mid-way between the Philippines and Thailand on one hand, and Singapore and China on the other. However, while the first three countries' investment performance has levelled off, Singapore and China are accounting for ever more FDI. In particular, China which competes directly with Malaysia in labour-intensive electronics is moving ahead.

Table 4.3  
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Philippines</td>
<td>1343</td>
<td>2212</td>
<td>1725</td>
<td>1345</td>
<td>982</td>
<td>1792</td>
<td>319</td>
</tr>
<tr>
<td>Thailand</td>
<td>2269</td>
<td>7491</td>
<td>6091</td>
<td>3350</td>
<td>3813</td>
<td>1068</td>
<td>1802</td>
</tr>
<tr>
<td>Malaysia</td>
<td>5816</td>
<td>2714</td>
<td>3895</td>
<td>3788</td>
<td>554</td>
<td>3203</td>
<td>2474</td>
</tr>
<tr>
<td>Singapore</td>
<td>8295</td>
<td>7690</td>
<td>16067</td>
<td>17217</td>
<td>15038</td>
<td>5730</td>
<td>11409</td>
</tr>
<tr>
<td>China</td>
<td>32799</td>
<td>45463</td>
<td>40319</td>
<td>40715</td>
<td>46878</td>
<td>52743</td>
<td>53505</td>
</tr>
</tbody>
</table>

Source: Hew 2006:263

Furthermore, attempts to foster linkages between the electronics sector and the local economy have been, by and large, unsuccessful. As Chapter Three mentioned, the electronics sector has few links to the local economy and is targeted at a reduced number of markets. Malaysia's base of supplier firms is small and underdeveloped. There are not enough local firms to offer a sufficiently diversified array of services. In addition, they do not have high levels of expertise, a sophisticated inter-firm division of labour, or unique capabilities.

Thus, since 1985 the state has been comparatively successful at attracting FDI and encouraging MNCs to upgrade their operations. In particular, investment incentives and sophisticated targeted infrastructure were initially very successful in attracting more FDI.

However, industrial-technological transformation has been hampered by the lack of an enabling institutional environment to help local firms develop more sophisticated supporting services – as seen by the atrophied base of supplier firms and generally limited degree of technological ability. This has been due to the breakdown in communication and mistrust between the state and the predominantly-Chinese manufacturing sector as well as confusion regarding affirmative action policies and initiatives to boost firms’ technological capabilities.

Summing Up

Thus, after 1985, the state scaled back its unequivocal pursuit of NEP goals. This decision caused a split in the ruling UMNO party over the relative importance of the inter-ethnic redistribution of wealth vis-à-vis fostering economic transformation. In the wake of the split, power was centralized around the executive at the expense of other state institutions, including state governments. While attempting to create a class of Bumiputera entrepreneurs, the state also sought to establish channels of communication or ‘embeddedness’ with the Chinese business community. While Chinese firms grew in the less restrictive environment, the state’s refusal to utilize existing and legitimate intermediary institutions hampered effective dialogue. The state’s courtship of foreign capital was initially successful and resulted in higher levels of investment and some more sophisticated operations. However, due to the lack of communication and the mistrust between the state and manufacturers, attempts at fostering greater capabilities foundered. Malaysia’s unsuccessful bid at industrial-technological transformation has left local firms in the unsustainable position of competing on price.

Conclusions

This chapter has looked at Malaysia’s institutional regime and industrial policy framework. This has been done in order to establish the national context within which Penang’s sub-national state operates. Thus, the chapter has: studied the bureaucracy, its capabilities and priorities, and its relationship with the private sector; evaluated the country’s industrial
policy framework; and laid out federal-state government relations. In so doing, it has argued that while the Malaysian state has overseen a structural transformation of the economy from agriculture to industry, it has been unable to foster industrial-technological transformation though enabling local firms to deepen their technological capabilities.

The reasons for this are several. First, while cohesive and moderately capable, the Malaysian state has not prioritized the pursuit of economic growth and transformation above other considerations. The events of 1969 led the country’s governing elites to conclude that the inter-ethnic re-distribution of wealth needed to be the prime goal of state action. While the state generated a vision for development and moved to staunch ethnic conflict, it became evident that distributing wealth without seeking to create it first was unviable. Even after this, the simultaneous pursuit of economic transformation and the inter-ethnic redistribution of wealth often impaired effective state action.

Second, the relationship between the state and the private sector was far from the ideal of embedded autonomy. Far from being unified, the private sector was divided along ethnic lines, with each section having a sub-optimal relationship with the state. On one hand, the Bumiputera commercial and industrial community’s relationship with the state was often characterised by patronage and rent-seeking. On the other, the relationship with the Chinese business community broke down in the wake of the NEP. While the state moved to correct this after 1985, effective dialogue was stunted through the state’s decision to bypass existing mechanisms of representation.

Third, these compromised relationships dramatically affected the industrial policy framework. While international capital was successfully solicited, the capabilities of local firms did not develop sufficiently to effectively cater to evolving MNC demands. On one hand, the excessively close relationships between UMNO, the state, and the Bumiputera business community prevented the application of performance criteria or disciplinary mechanisms on non-performing firms. On the other, the legacy of mistrust between the state and Chinese capital prevented the flow of industry-relevant information into policy-making. In addition, Chinese-owned manufacturing firms were loath to avail of state-led initiatives to enable them to deepen their technological capabilities.
Thus, Malaysia’s institutional and policy context have not been ideal for fostering industrial-technological transformation. While proactive at courting international capital, local capabilities have not been sufficiently nurtured. In addition, over time power has increasingly flowed upwards from the state-level to the national-level. The centralization of power in the executive has dramatically reduced state governments’ room for manoeuvre.
CHAPTER 5

The Penang Case Study

Introduction

Chapter Three discussed the development of the electronics sector in Penang and the challenges it currently faces. It argued that while Penang has emerged as Malaysia’s most dynamic electronics centre, it has not engineered a fully successful industrial-technological transformation, as it only occupies an intermediate position on the value chain. Its limited hosting of more value-added tasks such as design, marketing, and distribution has not made it immune to the emergence of low-cost, high-volume competitors.

Chapter Four examined Malaysia’s national-level institutions and industrial policy framework, arguing that, despite high levels of economic growth, the country did not engineer successful economic transformation. Despite promising beginnings, the state departed from the developmental ideal, losing bureaucratic capacity, falling prey to rent-seeking, and placing the ethnic re-distribution of wealth above industrial-technological transformation. While the state engaged in rent-seeking with some elements of the business class, it neglected communication with other, more productive segments. This lack of communication, coupled with multiple goals – of which economic transformation was one of several – led to sub-optimal policy choices.

Using data from a range of primary sources and applying the DS framework set out in Chapter Two, this chapter will examine how the Penang State Government, through its constituent institutions and policy choices, influenced the development of its electronics sector.

To this end, this chapter will be divided into six sections. After a brief synopsis of Penang’s colonial experience and first years in the Federation, the next three sections will each analyse one period of the province’s recent development. As with the previous chapter, a Historical Institutional approach will be adopted, assessing each epoch’s political and institutional context, before proceeding to analyse policy choices and outcomes. The last
section will summarize and put forward the chapter’s main conclusions. Where appropriate, comparisons will be made with the Karnataka case study.

Colonial Penang

Penang was the first British settlement in Malaya, established in 1786 by the British East India Company, which was seeking to forge a trade route to China (Wu 2003:23). In 1826, Penang was grouped with Singapore and Malacca to form the Straits Settlements. Up until 1957, Penang capitalised on its strategic location and free port status, developing as a prosperous regional centre for shipping, storage, and financial services. It catered to markets in northern Sumatra, north Malaya, southern Thailand, Burma, and even parts of India (Hanna 1962:96).

With its trading role and incorporation into the British Empire, Penang’s ethnic composition evolved dramatically. Originally scarcely populated, it received influxes of peninsular and Sumatran Malays, merchants from northern India, and petty traders and labourers from southern India. With the establishment of tin mining in nearby states, Penang then began to absorb workers from Southern China. The Chinese population continued to grow, surpassing the Malay population in the early 20th century (Turnbull 2004:28, Leng 1969:56-58).

At independence, Penang was the only state with a Chinese majority (Leng 1969:57,64). While its large Chinese population, trading history, and more direct links with Britain distinguished it from other states on the mainland, these did not constitute barriers to incorporation with the newly-independent Malayan Federation.

---

1 The island originally belonged to the Sultan of Kedah, who subsequently leased an additional strip of land on the peninsula to the British in 1800 – both of which form Penang State today.
2 Due, in part, to its distance from Singapore and combination of cultures, Penang became a regional centre of intellectual activity. It possessed a core of high-quality English and Chinese schools that educated elites from the region. The state was home to a number of influential Malay, Chinese, and English newspapers, and also became a centre for the Islamic reform movement in Malaya and Indonesia (Hanna 1962:97, Turnbull 2004:31).
3 There were, however, two movements for Penang’s secession from the Malayan Federation in the late 1940s and mid 1950s, which aimed to preserve the state’s trading privileges and direct links to Britain. While popular among the province’s commercial elites, the movements did not have broad-based support and were short-lived. See Sopiee (1976:56-80).
Penang in the New Federation (1957-1969)

At independence, Penang was a relatively rich state, reliant on free trade and services. As will be seen, this contrasts with Karnataka's early state-led model of development. Yet, both provinces were different and somewhat more economically advanced than their neighbours. At independence and upon their inclusion into their respective federal governments, both had to negotiate to preserve their achievements and autonomy.

The Economic Situation

Penang's reliance on trade and its ancillary services served it well in colonial times. However, the state entered the Malayan Federation with scarce natural resources, a declining agricultural sector, and a high population growth rate (Nathan Associates 1970:11). In addition, its open, trade-based economy was out of kilter with the thrust of new national policies.

Penang had a reputation as a cheap, efficient port. However, rising protectionism in neighbouring countries affected trade levels. The volume of goods shipped to these countries through Penang fell precipitously – decreasing some 75 per cent between 1962-67 (Penang Chamber of Commerce 1968:4). Furthermore, the country's economy began to gravitate toward Kuala Lumpur. Consequently, the share of commodities shipped through Penang fell from one third of the national total in 1962 to 18 per cent in 1968 (Nathan Associates 1970:54,63). Penang's free port status was also revoked in 1969, further decreasing the volume of goods passing through the port and increasing the cost of living.

While Penang was an established centre for manufacturing, this was unable to compensate for the decline of the trading sector. The bulk of manufacturing was basic and oriented to processing primary products and, at the end of the 1960s, this sector only accounted for 12 per cent of GDP and 10 per cent of the state's employment (Nathan Associates 1970:37-43).
The national drive towards import substitution industrialization had only a modest impact on Penang. The Penang State Government (PSG) completed one industrial park and began work on another. However, growth was limited by the small domestic market and Penang’s distance from other major population centres (Penang Chamber of Commerce 1968:10). Thus, in 1969, the park housed only 15 factories employing some 2,400 people (Singh 1989:3).

Penang began to fall behind other states. During the 1960s, Penang’s economy grew at 3.2 per cent per annum, versus 4.7 per cent for the country as a whole, and its unemployment rate of 15 per cent was more than double the national average (Penang Chamber of Commerce 1968:9). The state’s GDP per capita relative to the rest of the country fell from near parity in 1965 to some 90 per cent by the end of the decade (Nathan Associates 1970:85).

It also became clear that the Federation’s new financial arrangements were not favourable. Revenues for state governments came from natural resources such as forests, land, and mines, which was not beneficial for a resource-poor state like Penang. While the province’s per capita income in 1969 was 92 per cent of the national average, its tax revenues were only 62 per cent of the corresponding figure. Indeed, state expenditure per capita actually fell over the course of the 1960s (Nathan Associates 1970:74-77).

The Political Situation

Like other states in the Federation at this time, Penang was ruled by the Alliance, as the Chief Minister and Alliance representative was an MCA member. However, MCA’s legitimacy began to erode, as Chinese voters perceived that the party did not have the requisite autonomy or strength to promote their interests.

MCA’s limitations were made evident in 1959, when it proved unable to secure key concessions regarding parliamentary nominations and Chinese education policy from
UMNO.⁴ The MCA President, Lim Chong Eu, resigned from the Alliance and established a short-lived political party in Penang, the United Democratic Party (UDP). In spite of his inability to prevail over UMNO, his attempts to protect Chinese interests won him considerable support among voters in Penang (Leng 1969:157).

It was in this context that the Parti Gerakan Rakyat Malaysia (known as Gerakan) was founded in 1968. Gerakan was a new type of party, as it was multi-racial and technocratic, recruiting its cadres from academic and professional circles.⁵ The leadership of the party came from: the UDP, the Labour Party, trade unions, and academia. In turn, the membership base came from the UDP and moderate factions of the Labour party (Gerakan Manifesto 1968:1, Gerakan website⁶).

Despite its recent creation, Gerakan was able to effectively compete in the 1969 elections. Lim Chong Eu contested in Penang and other Gerakan candidates ran in Kuala Lumpur and Johor Bahru (Chew 1970:60). Aided by the ailing economy and the termination of the state’s free port status, Lim made the argument that the incumbents uncritically followed federal government directives against the state’s interest.⁷ Gerakan won decisively in Penang, securing 16 out of 24 state seats.

**Summing Up**

Thus, Penang’s first years in the Federation did not prove overly beneficial. The federal government favoured the centralization of economic power in Kuala Lumpur and the promotion of import substitution industrialization to the detriment of Penang’s open, trade-oriented model. Given the province’s distance from the centre of policy-making, its predominantly Chinese population, and the imbalance of power between UMNO and MCA, the PSG had little room for manoeuvre. By the end of the decade, the ensuing economic situation laid the foundation for a political change in the state leadership.

---

⁴ Interview with Lee Kam Hing, Research Director, The Star Newspaper, Kuala Lumpur (30/04/2004).
⁵ Interview with Francis Loh, Professor, School of Social Sciences, USM, Penang (20/02/2004).
Similarly, Karnataka did not initially benefit greatly from its inclusion into India. The negotiations for its accession benefited the landed elites, who promptly directed state government resources to fund agriculture. However, Karnataka’s capital city began to receive select and high-end investments in science and technology from the central government.


Gerakan’s advent to power heralded a new era for Penang. Unlike in Karnataka during this period, where political changes took a long time to translate into policies, in Penang the effect was immediate and drastic. The change in the province’s political context was to have far-reaching effects on Penang’s institutional regime, policy framework, and economic structure.

The Political Context

While the election victory gave Gerakan a mandate for change, its viability outside the Alliance-led government was questionable. The May riots had dramatically altered the country’s political context and it became evident that, in a climate of heightened Malay nationalism, Penang’s political and economic fortunes would suffer if it were an opposition-led state.8

Lim, as the Party’s Chairman, concluded after consultations with the Prime Minister that there needed to be a compromise. Thus, Gerakan joined the Alliance coalition in 1972.9

This decision, while beneficial, also changed the nature of the party which lost many

---

7 Interview with Chet Singh, former General Manager, Penang Development Corporation, Penang (09/02/2004).
8 Lim was able to foresee the difficulties that states such as Kelantan and Terengganu would have under opposition-led governments. ‘It was clear that you could not go the route of PAS and be in opposition, where would the money come from?’ Interview with Anwar Fazal, former Private Secretary to the Penang Chief Minister and Founder of the Consumers’ Association of Penang, Penang (05/04/2004).
9 This was subsequently re-named Barisan Nasional in 1974. The Gerakan website states rather baldly that ‘Dr. Lim Chong Eu had gradually come to grasp with the realities of the day…co-operation with the Federal government was deemed necessary to obtain financial assistance for the many economic projects that he had planned to deliver during his tenure of office’. http://www.gerakan.org.my, accessed 03/03/2005.
former Labour and trade union members (Tan 1991:207, Khoo 2000:6). With their departure, Gerakan essentially became a Penang-based regional party and its Chinese nature was further bolstered by the absorption of numerous disillusioned MCA reformists (Gerakan website\textsuperscript{10}).\textsuperscript{11}

However, while Gerakan was a member of the re-named Barisan Nasional (BN), Lim was able to establish and maintain a considerable degree of autonomy. In part, this was due to his legitimacy as a ‘first generation Malaysian politician’ who ‘had been right at the top of the independence movement’.\textsuperscript{12} In addition to being Gerakan’s Party Chairman, Lim was also the Penang head of Barisan Nasional and made his leadership felt over other parties, including UMNO.\textsuperscript{13}

Lim further increased his room for manoeuvre by maintaining good relations with the Prime Minister, with whom he had established a personal relationship while at the helm of the MCA.\textsuperscript{14} This gave him some flexibility to circumvent restrictive federal institutions and policies.\textsuperscript{15}

Gerakan’s subsequent election performance in 1974 confirmed its appeal and subsequent utility to BN. Its professional and technocratic image was more attractive to Chinese voters than MCA, which was progressively losing ground to Gerakan and Chinese-based opposition parties. In addition, Gerakan’s regional focus, as evinced by Lim’s decision to not move to Kuala Lumpur, also made it clear that the party was not seeking to pose a national-level challenge to UMNO hegemony.\textsuperscript{16}

\textsuperscript{10} http://www.gerakan.org.my, accessed 03/03/2005.
\textsuperscript{11} Gerakan even transferred its headquarters from Kuala Lumpur to Penang (Lim 1971:1).
\textsuperscript{12} Interview with Khoo Boo Teik, Associate Professor, School of Social Sciences, USM, Penang (08/04/2004).
\textsuperscript{13} One example of this was Lim’s refusal, against established convention, to give state land to UMNO for its party headquarters in Penang, requiring it to purchase land from the state government like other investors. Interview with Francis Loh.
\textsuperscript{14} Interview with Lim Pao Li, former Senior Manager, PDC, Kuala Lumpur (10/05/2004), and Goh Ban Lee, Associate Professor, School of Social Sciences, USM, Penang (25/02/2004).
\textsuperscript{15} ‘Federal departments in Penang were not legally under Lim Chong Eu, but he was politically very astute and could get the Feds not to intervene. He did, though, have the informal power to veto appointments of Federal Officers that he did not like. He was reputed to have asked one officer to leave, stating that he did not want him in ‘his’ state.’ Interview with Khoo Boo Teik.
\textsuperscript{16} Interview with Francis Loh.
The Institutional Context

The Penang Development Corporation

Although the movement towards centralization would gather momentum in the 1980s, there was already significant federal monitoring of state-level activities in the early 1970s. One tactic Lim, as Chief Minister, used was to move into new areas outside federal government control.

Inspired by Singapore's Economic Development Board, the Federal Government established State Economic Development Corporations (SEDCs) that were 'responsible for undertaking economic and social development' in each state. During the first years, these Corporations were only supervised by their respective state governments. However, after 1974, supervisory responsibilities were shared with the federal Ministry of Public Enterprises. In spite of this, the Corporations were statutory authorities, which meant they were accorded more leeway than most government institutions (Singh 1979:3).

Taking advantage of this context, Lim appropriated the Penang Development Corporation (PDC) as an institutional vehicle to implement his policies. Upon its creation in 1971, the Penang State Government designated the PDC as its principal agency for social and economic development, and Lim was appointed as its Chairman.

The PDC's autonomy regarding staffing was used and many employees were 'hand-picked', giving the institution a 'climate of newness'. In the words of its first General Manager:

In the beginning, the state government used to be staffed by federal officers, who were then paid by the state government. The creation of the PDC enabled this control over staffing to be circumvented. The state government could not control posts, so the PDC gave them flexibility. This worked for about seven to eight years. Actually it worked up until 1990, and since then has eroded.18

17 Interview with Lim Pao Li.
18 Interview with Chet Singh.
During the 1970s, the PDC was relatively small, with some 70 professionals out of a total of 300 staff. Many of the first recruits had worked on an extensive review of the state’s economic situation and so were familiar with its economic structure and challenges (Singh 1989:9). This nucleus of people was subsequently bolstered with others from outside Penang. Perhaps because of its autonomous stature, the institution had a very low attrition rate. The average tenure was 17 years and provided the institution with a cadre of experienced management personnel.

During the first years of its existence, the PDC answered only to a Board appointed by the state government and it was ‘first among equals’ amid the various PSG institutions. The Chief Minister and the State Government picked the PDC Board members with considerable care, the aim being to get a ‘mix of people with ideas’ and ensure a climate of ‘internal debate’.

There were representatives from state branches of key federal institutions such as the Malaysian Industrial Development Authority (MIDA), the Treasury, and the Malaysian Industrial Development Fund. There were also representatives from local government and state government bodies (PDC Annual Reports 1977-80). The input from different institutions, both state and federal, enabled a global vision of Penang and its needs – while keeping the federal government informed.

Lim was also careful to cultivate relationships with the newly established University of Penang. The head of the Centre for Policy Research, K.J. Ratnam, was a long-standing...

---

19 The Nathan Report. See next section.
20 ‘Many of the PDC were from outside Penang. The first batch of Penang-born came only in 1975. This was in part a political decision, so there would be impartiality. It was a close-knit group, and they used to be the favourites of the CM [Chief Minister]’. Interview with Mukenden Menon, former Senior Manager, PDC, Penang (0303/2004).
21 This is not to say that the institution did not face human resource constraints. In particular, during its first years, the PDC had difficulty finding and retaining technical personnel, largely due to the higher salaries paid in the private sector. See Singh (1979:10)
22 Interviews with B.J. Yeang, former Deputy General Manager, PDC, Penang (31/03/2004), Khoo Boo Teik, and Lim Pao Li.
23 The climate of interchange was bolstered by so-called ‘jam sessions’, where PDC staff would meet the Chief Minister every week to discuss issues facing the state. These meetings were also attended by a variety of people chosen for their technical input, including state and local government officials and a ‘sprinkling’ of politicians. The meetings were deliberately kept informal in order to encourage the expression of new ideas and approaches. Interview with Mukenden Menon and Singh (1979:7).
24 Established in 1969, and subsequently re-named Universiti Sains Malaysia (USM).
representative on the Board. Ratnam and other academics were used as ‘sounding boards’ for new ideas and the Centre provided technical information to the state government on agricultural, industrial, and regional policy issues.\textsuperscript{25}

Thus, its small size, targeted recruiting, constant access to high-quality information, and political backing enabled the PDC to build considerable institutional capacity. In a relatively short time, the PDC came to approximate the ideal of a developmental pilot agency, coupling high levels of bureaucratic capacity, autonomy, and embeddedness with the private sector.

**Policies**

The creation of an autonomous institutional vehicle was combined with a clear policy direction for Penang’s economic development. The state’s decline in the 1960s made it evident that an alternative development model had to be found. The federal government had commissioned an in-depth study of Penang’s economic situation in the late 1960s, and the new state government took the so-called Nathan Report as its blueprint for economic policy.\textsuperscript{26}

**The Nathan Report**

Citing the state’s dearth of natural resources, the Report recommended that Penang foster manufacturing and tourism to diversify the economy and reduce unemployment. It argued that Penang already had a well-developed industrial set-up that only required marketing to investors and recommended capitalizing on the infrastructure developed for the state’s trading activities, such as the road network, port, and core of supporting services.\textsuperscript{27}

\textsuperscript{25} Interview with Francis Loh, and the Centre for Policy Research website - \url{http://www.usm.my/cpr/index.html}, accessed 08/04/2005.

\textsuperscript{26} The Nathan Report had its genesis in a request by Lim Chong Eu (then in opposition) in 1965 for a study of the state’s economy. Messrs. R. Nathan and Associates was a US-based economic consultancy company contracted by the Federal government (PDC 1990:8-10).

\textsuperscript{27} The Nathan Report states: ‘There are probably few if any potential industrial centers in Malaysia which can provide space for as many employment opportunities with as little incremental expenditure on industrial and social infrastructure...the coexistence of large acreages available as manufacturing sites in the midst of a densely populated area, served by adequate rail, road, water and air transport and provided with most of the
In addition, the Report recommended exploiting Penang’s comparatively well-educated workforce, comprised of a large number of workers with a complete lower secondary education and a significant number of university graduates (Nathan Associates 1970, Vol I:22, Annex:111). Thus, the Report recommended an initial focus on labour-intensive manufacturing as the province’s ‘most abundant resource, and its source of greatest comparative advantage, is its underutilized, high quality, low-wage labour force.’ (Nathan Associates 1970:218)

The Report also proposed several innovative ideas. In spite of the popularity of import substitution industrialization at the time, it recommended inviting foreign firms to invest and produce for export. It further suggested fostering labour-intensive operations during 1970s and early 1980s, but subsequently attempting to host more capital-intensive activities. In particular, it stressed the importance of linkages to the local economy (Nathan Associates 1970:218, ATIP 1996:3).

The Report dovetailed well with the new federal policy framework, which favoured export-oriented industrialization through attracting foreign capital. The federal government passed key enabling legislation such as the Investment Incentives and Free Trade Zone Acts in the late 1960s and early 1970s.

With this broad vision set out, the state government and the PDC embarked on a multi-pronged industrialization drive. First, they marketed Penang to overseas investors, acting as facilitation agents with the federal government to expedite approvals. Second, they moved aggressively to provide infrastructure for investors, including industrial parks, land, trained workers, and nearby low-cost housing for the rapidly growing workforce. Third, they invested in a variety of start-ups. Fourth, they helped reduce information asymmetries through matchmaking between MNCs and local supplier firms. Fifth, they created targeted mechanisms for skill provision. And, most importantly, the PDC resorted to unorthodox means to raise capital to fund these activities.

essential social infrastructure is a unique attribute on which to base a programme of accelerated economic development’ (1970:204).
Investment Promotion

Regarding investment promotion, Lim moved quickly to court foreign capital, specifically in the electronics sector. Basing his analysis on Japan and Hong Kong, he saw that the industry had significant potential for increasing skill intensity. To this end, the PDC regularly embarked on trade missions overseas, often targeting the CEOs of US-based semiconductor manufacturers such as Intel, AMD, and National Semiconductor (Rasiah 1999a:233).

The Penang State Government was successful in conveying its commitment to potential investors. Andy Grove, Chairman of Intel, relates that his decision to invest in Penang was sealed when the PDC laid a road overnight to enable him to inspect a potential building site (The Edge 27/04/2003). Four MNC directors stated

Penang’s chief minister was among the earliest and most active political leader from Southeast Asia to knock on our doors... He gave us a certain assurance that got our commitment to locate here. (Rasiah 2001:175)

Although it had to compete with other national and regional competitors, the Penang State Government was able, through good timing, to capitalize on the emerging international division of labour. According to a senior PDC official:

you had FTZs in Korea, Philippines and Singapore. But Penang was not in the picture. Personnel from Singapore-based companies came to Penang on holidays... They began [here] with some pilot operations. All incentives were given by the Federal Government, but Penang moved ahead of other states. It had an airport and a seaport, but it needed someone to package them together.  

---

28 He stated that 'The electronics industry is a labour intensive industry in which especially the simpler forms of assembling or manufacture of parts require not only a large number of hands but also cheap rates of pay until they are trained and have acquired skills to enable them to manufacture the more sophisticated instruments...the cost of labour will automatically right itself when we have been able to build up so many industries that the supply of labour cannot meet with the demands of the new industries established in the state'. (Lim 1971:9-10)

29 Interview with Mukenden Menon.
This drive worked well, particularly with electronics component producers. National Semiconductor, an American merchant semiconductor firm, was the first to establish operations in 1971. This was followed by a wave of investments from other semiconductor producers such as AMD, Intel, Motorola and Hewlett Packard from the US, Siemens from Germany, and Hitachi from Japan. Consumer and industrial electronics producers like Clarion and Bosch also invested in the state (PDC 1990:17-18, Electronic Business 11/01/2003).

In spite of limited power, as virtually all meaningful incentives were decided at the federal level, the PDC was able to make the investment process quicker and more agile. According to one former official:

The PDC was different – it was effective because it worked around loopholes...During the late 1960s and early 1970s, Penang had nothing to offer. It could not offer real incentives. It could only really be responsive to industrialists and so behaved as a real business. The customer comes first was the ethos, and so made all the difference.  

A key component of this effectiveness lay in a well-nurtured relationship with the Malaysian Industrial Development Authority (MIDA) who, as the federal industrial authority, ultimately approved investment and formulated incentives. The personal links with the federal government agency were key and enabled the two institutions to work well together. MIDA was good at offering incentives and ‘wrangling’ new projects, in turn, the PDC would follow up with investors, facilitating the paperwork and settling-in process.  

The PDC also placed considerable emphasis on the cultivation of personal relationships with investors. Regular meetings were held with them, supplemented by private meetings with individual companies (Singh 1989:7). In several instances, due to its close interaction with investors, the PDC was able to move quickly to secure key incentives from MIDA.  

---

30 Interview with Lim Pao Li.  
31 This was helped by the fact that, during the 1970s, the General Manager was a prominent former civil servant from Penang. Haggard et al. (1998:15) and interview with Mukenden Menon.  
32 For example, in the late 1970s, the first investors in Penang were re-negotiating their tax-free status, which was about to expire. To pre-empt relocations, the PDC acted decisively to help investors register new companies or products to be able to re-qualify for the incentives. Interviews with Chet Singh and Lim Pao Li.
Targeted Infrastructure Provision

In addition to attracting investment, the PDC worked to provide the requisite infrastructure. This entailed developing industrial parks and free trade zones (FTZs), inspired by similar initiatives in Ireland and Taiwan. The PDC pioneered the building of FTZs in Malaysia, with the first set up in 1972 (Singh 1989:3). By 1980, it was managing four FTZs and four industrial parks (Nesadurai 1991:106, PDC 1990:17-18).

These industrial parks were complemented by residential projects to house the newly-urbanizing workforce. One was set up on the island for workers in the electronics and textile industries, and another was set up for those employed on the mainland. By 1980, the PDC had built some 4,000 houses in these areas (PDC Annual Report 1980:25).

The PDC also undertook an ambitious urban renewal program as part of the drive to project the state as an important and modern commercial centre in the region. One of its most visible results was the 65-storey KOMTAR building, which was, at that time, the tallest building in Southeast Asia (PDC 1990:28-33).33

Self-discovery

The PDC was also an active participant in the economy, setting up a wide variety of enterprises.34 By 1980, the PDC had invested RM 14.2 million in 17 wholly-owned, subsidiary, or associated companies (PDC Annual Report 1980:23). These investments served a variety of functions. First, they were important in demonstrating the PDC's commitment to a particular initiative. Second, they were also used to attract investments in a specific area by reducing some of the risks associated with establishing new industries. Third, they also sought to diversify the state's economic base.

---

33 At present, it houses local, state, and federal government offices as well as a variety of retailers. Interestingly, the UMNO party headquarters is not housed in KOMTAR, but is in a separate building down the road. While not as tall as the second building, it is one of the only other skyscrapers in downtown Georgetown and its dark grey and angular structure is a stark contrast to KOMTAR’s white, circular tower.

34 ‘Lim Chong Eu’s approach was to cast a big net’. Interview with B.J Yeang.
Thus, the PDC sought to promote alternative agricultural products. After conducting market studies, a mushroom farm was set up along with two firms in upstream activities such as food-processing and marketing (Lim 1971:12, PDC Annual Report 1977:13). The PDC also established companies in the real estate, furniture, textile, ship-building and high-quality glass-fabrication sectors. It launched three electronics firms, including a joint-venture with Hitachi to make silicon transistors and integrated circuits (PDC Annual Report 1977:13). The PDC also participated in the federal government’s drive to foster a Bumiputera business class, creating two Malay-managed companies to this end. In addition, it invested in two joint ventures with the Government of South Australia to diversify the state’s trade links (PDC Annual Report 1980:23).

The success of the PDC’s industries was mixed. In several cases, such as the shipbuilding sector, production began during periods of over-capacity. In addition, many of these enterprises had to bear social costs, such as not retrenching workers during slumps in the business cycle (PDC Annual Report 1977:13). The PDC General Manager stated:

The performances of these investments in terms of profits and returns have not been good as major investments in the fields of electronics, button mushroom growing and shipbuilding did not succeed as envisaged. These areas were more venture risks but as venture capital was not available then, PDC had, in a sense, played the role of a venture capitalist to spearhead investment in areas which were new to local investors in Penang. (Singh 1989:6)

In addition to seeking to reduce risk levels associated with new industries, the PDC also established companies to capitalize on their externalities. Thus, perhaps the most important company set up during this time was PenElco. This company, wholly-owned by the PDC, operated from 1970-75 and was established to manufacture kit transistors and radios (PDC Annual Report 1979:12). According to the Chief Minister,

In choosing the electronics industry as one which is desirable to be introduced into the State of Penang I have had to face the fact that no entrepreneur has considered it

---

35 Malaysia Foods Bhd and Mushroom and General Trading Sdn Bhd.
worthwhile to establish a factory in the State and consequently it was necessary to embark on some promotion exercise so as to place Penang on the ‘electronics map’...it was decided that there is no better way of demonstrating that Penang is suitable as a centre for the establishment of the electronics factories than by actually establishing one to serve as an example to prospective entrepreneurs. (1971:11)

While the company was ultimately dissolved, it was key in convincing investors like Clarion and Hewlett Packard that manufacturing operations were viable in Penang.

Reducing Information and Coordination Externalities

The PDC began to work with a small number of local manufacturers over the course of the 1970s. Penang had a group of some 300 firms in the metalwork and fabricated metal product sectors, some of whom began to act as suppliers to MNCs (Chang 1984:3.51). This sector, which was overwhelmingly Chinese, had a tense relationship with the federal government, largely due to the NEP and the Industrial Coordination Act.37

The PDC’s intermediary role was possible due to the ‘good rapport’ that Lim Chong Eu had with local businessmen, in particular his legitimacy as a politician who had attempted to protect Chinese interests. Thus, the PDC began to work with a small group of local manufacturers who knew Lim Chong Eu through the local branch of the Chinese Chamber of Commerce or his monthly ‘field-trips’.38

The Chief Minister began to encourage MNC managers to source components locally, and in the mid-1970s began to broker meetings between MNC directors and local manufacturers. Thus, local firms such as Eng Hardware and LKT began to provide simple

36 Penang Electronics, Atlas Electronics, and Hitachi Semiconductors.
37 The 1957 Industrial Census found that 80 per cent of workers in Penang’s manufacturing sector were Chinese (Leng 1969:71). A review of the firms in PDC industrial parks found that ‘many small firms want to stay as far away from government as possible’ and that most had avoided contact with government bodies or other local companies (Von der Mehden 1973:13). The report recommended that the PDC set up a liaison office to cater to small Chinese-owned firms, and that there be some mechanism for the collective representation of their interests.
38 The Chief Minister would take a monthly trip to different parts of the state to talk to businessmen, state government officials, and other citizens. Interview with Lim Pao Li.
subcontracting services to companies such as Intel and AMD (Rasiah 2001:1976, Jomo et al. 2003:116).

**Targeted Skills Provision**

The PDC also provided workers with the necessary skills for the emerging electronics sector. Although it folded, PenElco provided a nucleus of skilled labourers, almost all of whom were subsequently recruited by MNCs (Lim 1971:12). In addition, the PDC also attempted to overcome market failures in training through the creation of the City In-Service Training Centre to 'provide a reservoir of trained and skilled labour that would move into the new industries' (Lim 1971:16). The Centre recruited school leavers, who were employed as parking attendants for part of the day and then trained to be machine operators or other types of skilled workers. 

**Revenue-raising**

While marketing was helpful for attracting new investment, the construction of the necessary infrastructure required funds. As Penang was not endowed with extensive natural resources and correspondingly high revenue, the PDC faced serious liquidity problems in its first years.

Thus, in perhaps one of its most innovative initiatives, the PDC used real estate development to raise revenue. The Corporation capitalized on state government control over land issues, one of the few areas deemed to be a state-level responsibility. To this end, in the 1970s, the PDC created a land bank through cheap purchases or by using an acquisition act, particularly for sites near key infrastructure. After converting the land into industrial sites, it then sold them for a considerable profit, often at a considerable mark-up. In spite of the mark-up, prices for industrial land were held slightly below market

---

39 Interview with Anwar Fazal.
40 This is in spite of having one of the most effective municipal tax collection systems in the country. The Penang Municipal Council was one of the first to computerize its tax records. This, combined with sending tax collectors from house to house, resulted in a virtual 100 per cent tax collection rate (Ruland 1992:219).
41 'We bought land for 50 sen and sold it for [RM] 3.50'. Interview with Chet Singh.
rates as an incentive for investors. The PDC was also active in residential development where it sold property at market rates. The profits from these sales were then sunk back into developing more industrial sites and investing seed money for new enterprises.

However, while generating considerable capital, the PDC did not make any real profit until the mid-1980s. That said, with the exception of an initial grant from the federal government, the PDC was essentially financially autonomous, earning revenue from real estate development and private sector loans (Singh 1989:7).

Outcomes

By 1972, there were 17 electronics facilities in Penang, employing 12,000 workers. This grew to 19 firms and 18,700 workers in 1978, and by 1980, Penang had a booming electronics sector that included a core of 25 electronics assembly facilities, providing employment for almost 25,000 workers in the PDC’s industrial parks. The manufacturing sector contained over 200 firms with 56,000 workers, of which about half were Malay (ISIS/PDC 1991:7-21, PDC Annual Report 1980:19).

While the industry was overwhelmingly labour-intensive, electronics firms began to upgrade their operations in the late 1970s. In particular, more skill and technology-intensive operations like testing were transferred to existing assembly facilities.

The state’s economy was thus transformed. In 1971, the state’s GDP per capita was 12 per cent below the national average, the most important activity was trading, and manufacturing accounted for only 21 per cent of GDP. In 1980, per capita GDP was 28 per cent above the national average and manufacturing was the state’s prime economic activity, accounting for 37 per cent of GDP (PDC Annual Report 1980:9).

However, the state government’s efforts were not corresponded by a commensurate increase in tax revenues, the totality of which flowed to the federal government’s coffers.

---

42 It also cross-subsidized low-cost housing from the sale of medium and high-cost housing (Singh 1989:5).
43 Interview with Mukenden Menon.
Rather, the benefits derived by the state government were better job opportunities, wealth creation, and improved living standards for its residents.\footnote{Interview with Chet Singh.}

In addition, the PSG had to carry out a delicate balancing act. As well as fostering economic growth, the state government needed to ensure that the country’s only Chinese-majority state did not appear ‘too’ successful. The Chief Minister alluded to these pressures in an interview:

> I hope more investors will be allowed to come to Penang. Sometimes they are not allowed; and very frequently are diverted elsewhere. I don’t mind if they eventually set up their industries elsewhere in Malaysia but sometimes they tell us that if they can’t come to Penang they’ll go to the Philippines. I think the Federal Government has to understand this problem. We may lose what we are promoting. The attraction of sea ports and airports are very great, and many industries prefer to be set up near them. (Malaysian Business, October 1976:26)

**Summing Up**

Thus, by the end of the 1970s, Penang’s economic fortunes had taken a marked turn for the better. The state had negotiated the transition from a declining trade-based economy to one based on manufacturing. Per capita income was now substantially above the national average and the swelling ranks of the electronics workforce had reduced unemployment.

In an institutional sense, the Penang State Government closely resembled the developmental state ideal. The Penang Development Corporation was ‘appropriated’ by the state government, and through judicious hiring, long-term capacity building, and political backing was converted into a professional pilot agency. Through a variety of mechanisms, staff members were given access to high quality technical advice from academics, businessmen, and high-level government officials to feed into policy. Most importantly, through its revenue-raising measures and high-level political backing, the PDC achieved financial and political autonomy from federal government directives.
Regarding policies, the PDC articulated a long-term vision for the state’s development and coordinated a wide variety of actors towards attaining this end. In addition, the Corporation avoided conflict through ensuring that the fruits of growth generated benefits for all ethnic groups. Furthermore, the PDC promoted investment, provided targeted infrastructure, funded a variety of self-discovery ventures, provided skilled workers, and reduced information and coordination failures. In particular, the PDC was able to act as an intermediary between the state’s predominantly Chinese manufacturing sector and international investors as well as the federal government. Penang’s decisive action and high quality ‘created assets’ allowed it to emerge as the centre for electronics production in Malaysia.

In contrast, during this period, the Karnataka State Government was far from resembling the ‘developmental’ ideal. While the province’s landed elites were losing their hold on Karnataka’s political life, its once-vaunted institutions were falling prey to rent-seeking. Furthermore, the State Government had little, if any, autonomy from Central Government directives. Some gains were made on the policy front, however, as the province’s new democratic reality saw a shift in priorities away from rural and elite interests, as industrialisation became an area for state action. In addition, unlike Penang, the province benefited from high-end investments by the Central Government, which served to create a pool of high-end labour and supporting industries.

**Maturity and Consolidation (1980-1990)**

The Penang State Government’s development model reached maturity during the 1980s. The PDC’s high level of bureaucratic capacity, access to high-quality information, and policy framework enabled it to foster greater levels of investment and economic growth. Despite an economic downturn in 1985, Penang-based firms responded well and began to move up the value chain, away from simple assembly tasks. However, the federal government began to centralize power, and the Penang State Government began to confront the limits of its constitutionally-mandated responsibilities.
The Political Context

The most important change in the national political context during this period was Mahathir’s rise to power. As mentioned in Chapter Four, Mahathir’s administration was characterized by a more repressive style of governance as well as the centralization of power and decision-making in the Prime Minister’s office.

Despite this, the Penang State Government was able to preserve a degree of autonomy. Lim’s status as an elder statesman and Gerakan’s membership in BN made the relationship with Mahathir easier, and Gerakan continued to demonstrate its electoral utility as its support among the Chinese community grew.\(^{45}\)

Mahathir also understood that if he wanted to retain Penang in the Barisan Nasional, it needed to have a Chinese Chief Minister. Furthermore, he appreciated the state government’s proactive approach and the employment opportunities that the manufacturing sector provided for Malays.\(^{46}\) However, beyond these rather utilitarian considerations, Mahathir’s interest in Penang was marginal. As will be seen, he clearly favoured Kuala Lumpur and his home state of Kedah for federal investment, often at Penang’s expense.

In spite of this, Lim Chong Eu proved apt at negotiating support for projects that would benefit Penang. In addition, the new, more adverse policy environment served to increase the Penang State Government’s drive to attract investment from both the federal government and MNCs.\(^{47}\) Thus, through constant lobbying Penang obtained federal funds to build the Penang Bridge in 1985, which connected the island to the mainland. Taking four years to build, it was the third longest bridge in the world and, along with KOMTAR, bolstered Penang’s reputation as a regional commercial centre.\(^{48}\)

\(^{45}\) In addition, Lim’s decision to relinquish his position as Gerakan Chairman in 1980 would have quelled any fears that he harboured ambitions for national office. That said, while no longer the Chairman, he still remained the de facto head of Gerakan. See Lim (1980:96).

\(^{46}\) Interviews with Khoo Boo Teik and Terence Gomez, Professor of Economics and Business Administration, University of Malaya, Kuala Lumpur (06/05/2004).

\(^{47}\) ‘It [Penang] was still a step-child due to national policies, but this made it more hungry’. Interview with a former state government official, Penang (March 2004).

\(^{48}\) Lim Chong Eu allegedly made Gerakan’s adhesion to the Alliance in 1972 contingent on the bridge being built. Interview with a political observer, Penang (February 2004).
However, difficulties within the Penang branch of Barisan Nasional began to emerge during the 1980s. While the electronics sector provided many jobs for Malays, UMNO began to allege that the PDC was not doing enough to promote Malay interests. Furthermore, relations with MCA were strained over their share of high-profile positions in the state government. While not crippling, this new domestic political reality required additional efforts to secure consensus. Politicians from different parties began to be placed on the State Executive Council, increasing the political – as opposed to technical – nature of policy work.49

The Institutional Context

The Penang Development Corporation

While the autonomy of SEDCs had begun to erode in the mid-1970s, federal control over the PDC’s operations increased markedly after 1980. All borrowing and investment decisions by SEDCs had to be approved and finances audited by the federal Ministry of Finance. In addition, authority over creation and grading of posts was withdrawn from SEDCs and placed under federal control (Singh 1989:8). Furthermore, in 1981 the PDC’s Board was reduced from 18 to nine members, three of which were now appointed by the federal government (PDC Annual Report 1981:49). Consequently, the Board’s composition changed markedly, away from a ‘mix of politicians, academics, financiers and senior civil servants’ who ‘could positively contribute to the Corporation’ (Singh 1989:8) to a collection of representatives from different political parties. According to a former PDC official,

The state started losing autonomy and control in the late 1970s and early 1980s. The PDC was absorbed into the federal government. There were regulations about who to appoint to the Board, recruitment of people, the NEP, and quotas.50

49 Interviews with Khoo Boo Teik and Lim Pao Li. The State Executive Council is the state’s principal planning authority, comprised of officials from the State’s Legislative Assembly picked by the Chief Minister.
50 Interview with Lim Pao Li.
In addition, the number of federal government ministries and institutions in Penang increased markedly during the 1980s. By 1991, there were 150 government agencies: of these, 36 belonged to the state government and 114 to the federal government. This inevitably gave rise to complaints about overlapping functions and bureaucratic inefficiencies (ISIS/PDC 1991:17-1).

The PDC also began to be affected by its federal counterparts’ slower speed and differing priorities. For example, Hewlett Packard had chosen Penang to establish a wafer fabrication facility in the mid-1980s. However, due to the federal government’s lengthy deliberations, Hewlett Packard changed its mind. Singapore’s quick decision-making process, aided by its attractive incentive package, succeeded in luring the company (Salih et al. 1989:384). Penang also floated the idea of making one of its islands an offshore banking centre, only to have the idea appropriated and applied elsewhere.51

The PDC’s room for manoeuvre was further constrained by the establishment of the Penang Regional Development Authority (PERDA) in 1983. This federal institution, charged with promoting Malay interests in rural areas, was created in response to UMNO’s claims that the Corporation catered overmuch to Chinese and urban sectors. The establishment of PERDA ‘was a direct challenge to [Lim] Chong Eu and Gerakan, as it bypassed the state government’.52 While it did not emerge as a particularly effective institution, PERDA’s acquisition land reduced the available real estate that PDC could use for industrial parks, thus affecting its revenue base.

Thus, the PDC continued to enjoy high levels of bureaucratic capacity, which had been built up the previous decade. However, the Penang State Government was losing control over staffing and budgetary decisions, and its effectiveness and flexibility was being comprised by the expansion of federal government institutions into its domain.

---

51 The island of Labuan is now an off-shore financial centre. Interview with a former state government official, Penang (February 2004).
52 Interview with a political observer, Penang (April 2004).
Business Associations

During the course of the 1980s, the PDC began to dialogue with different segments of the private sector in more formal settings.

The PDC began to work with the Free Industrial Zone, Penang, Companies' Association (FREPENCA). Comprised of 60 of the largest firms that employed some 60,000 people, FREPENCA was established to create 'a collective voice in dealing with government', and acted to reduce information asymmetries among firms regarding security, customs clearances, and infrastructure issues. FREPENCA also began to lobby the Penang State Government for more investment in infrastructure, better incentives, and more skilled workers.

The PDC’s own Consultative Committee of Commerce and Industries brought together representatives from the Malay, Chinese, Indian, and International Chambers of Commerce as well as the Federation of Malaysian Manufacturers (PDC Annual Report 1986:21). However, while a forum for issues facing the local private sector, the quality of dialogue was – as the next section will show – constrained by the Chambers’ orientation to traditional economic activities and the lack of representation from SMEs in the manufacturing sector.

Policies

Federal Government Policies

During the first half of the 1980s, federal government policy favoured import substitution and the promotion of heavy industry. Mahathir also attempted to create a Bumiputera business class through awarding grants and concessions, which resulted in a great deal of rent-seeking. Conversely, the relationship between the Malaysian state and the Chinese business class was at an all-time low, due to the enforced Bumiputera equity requirements.
That said, the export-oriented industry was largely unaffected by the promotion of heavy industry. The incentive regime for foreign investors, while appealing, began to be somewhat dated. In spite of the desirability of fostering technology-intensive industries, tax exemptions favoured labour-intensive operations and did not encourage more value-added tasks. Labour costs were also held down by large influxes of unskilled immigrants, lessening the need for capital investments. SMEs were not a priority and support programs were disorganized and dispersed across many institutions.

The subsequent recession in 1985 caused many of these policies to be re-evaluated. The state’s role in the economy was reduced, Bumiputera equity requirements relaxed, and subsidies for favoured firms cut back. The Malaysian state began to negotiate a less conflictual relationship with the non-Malay business sector, in particular seeking to elicit technical input for policy-making. And, while lacking an effective or comprehensive approach, the importance of SMEs began to be recognized.

**State Government Policies**

The PDC continued with the policy directions set out the previous decade, concentrating on attracting FDI through promoting its infrastructure, trained and available labour, and a personal touch with investors.

*Investment Promotion*

The PDC continued to market Penang through trade missions and exhibitions in East Asia, North America, and Europe, resulting in several new waves of investment. In 1988, the PDC played a crucial intermediary role between the Federal Government and the hard disk drive firms Maxtor and Applied Magnetics. As a result of these negotiations, the PDC helped lay the foundation for the state’s emergence as a hard disk drive manufacturing hub (McKendrick et al. 2000:212).
Targeted Infrastructure Provision

The Corporation continued to accommodate incoming firms in its eight industrial parks and their expanding housing developments, now including some 14,000 homes (PDC Annual Report 1989:29). In light of its success and PERDA's land purchases, the real estate available for industrial parks began to dwindle. Thus, the PDC undertook a project to reclaim 440 hectares of land from the sea in 1987 (PDC Annual Report 1987:17).

The PDC worked with the federal agency MIEL\textsuperscript{54} to build facilities specifically for small firms. These multi-storied factories were designed to reduce space and provide affordable ready-made facilities for SMEs, many of who were operating in residential areas (PDC Annual Report 1980:17). The Corporation also attempted to capitalize on some synergy by grouping the metal engineering firms in one park (PDC Annual Report 1981:18).

Self Discovery

The Corporation proceeded to expand its investment portfolio, which, by 1989, had grown to 24 firms worth RM 24.2 million. The portfolio's composition changed somewhat, away from testing the feasibility of new products towards more speculative activities such as real estate development, leisure facility management, and construction. In accordance with the directive of fostering the emergence of a Bumiputera capitalist class, several Malay-only enterprises were also founded. Due to the increased emphasis on real estate development, the PDC began to make a profit after the mid-1980s.\textsuperscript{55}

Despite this, the PDC still made some strategic investments. The unprofitable electronics firms set up during the 1970s were phased out and replaced by more technologically-intensive operations, including a precision engineering and a biotechnology company (PDC Annual Report 1989:29). In addition, in an effort to overcome credit constraints, an existing PDC company was tasked with providing venture capital opportunities for local companies (PDC Annual Report 1988:28).\textsuperscript{56}

\textsuperscript{54} Malaysian Industrial Estates Limited.
\textsuperscript{55} Interview with Mukenden Menon.
\textsuperscript{56} Australasia International Developments.
Reducing Information and Coordination Externalities

In addition to attracting investment, the PDC implemented a variety of policies to overcome information and coordination failures, building on its incipient intermediation efforts during the 1970s. These tentative, low-cost efforts were particularly helpful for local firms affected by the NEP and the federal government’s policy bias towards large firms. In some cases, the Corporation was able to play a productive role, but in others it was clearly constrained by the federal government’s industrial policy framework.

In 1985, the PDC set up a Small-Scale Industries Unit to cater to small firms (PDC Annual Report 1985:4). Although it largely ceased to function after two years, the Unit helped reduce information externalities through compiling a directory of local supporting firms in Penang. The directory detailed local suppliers in the metal, plastics, and packing sectors and what services they offered.

After the mid-1980s, Penang-based MNCs began to automate their operations, opting to subcontract simple operations to local firms. This was facilitated by established links between local entrepreneurs, PDC officials, and MNC managers based on ethnic networks. While the Corporation was instrumental in brokering contacts between MNCs and local companies, it did not possess the financial means to subsidize contracts or ‘protect’ local firms in a meaningful way.

One notable example of these matchmaking efforts was the establishment of Intel’s supplier network. The PDC played a key supportive role through convincing the local firms Eng Hardware and LKT to take on more sophisticated tasks from the MNC. The subcontracting ties were later expanded to other firms, such as Prodelcon and Metfab, in order to expand Intel’s supplier base and foster competition (Jomo et al. 2003:116-17).

The PDC also carried out crucial intermediary functions between local entrepreneurs and the federal government. The export-oriented policy framework, coupled with the establishment of FTZs, was not conducive to the emergence of local supplier firms. Goods sold to firms in free trade zones were treated as exports and thus liable for duty. In addition,
many supplier firms, which relied on imported intermediate components, had to pay duty. As a result, MNCs found it cheaper to source inputs from firms overseas. Furthermore, ‘indiscriminate’ approval of permits for foreign supplier firms also threatened to crowd out local supplier firms (Rasiah 1994:294, 2002a:180).

Thus, the PDC, upon petition from local businessmen, took their case to the Ministry of International Trade and Industry. In response, the federal government increased capital requirements for foreign firms, thereby affording a measure of protection to the small local supplier companies. Furthermore, the PDC also lobbied successfully for duty-free privileges to be made available to domestic firms who relocated to state government industrial parks (Rasiah 1994:295).

The country’s drive to develop the domestic heavy industry sector meant that local companies had to pay tariffs on specialty steel imports they needed to manufacture components. Consequently, the PDC helped organize collective efforts to procure bulk quantities of steel at lower prices (Rasiah 2001:177).

**Targeted Skills Provision**

The PDC moved to correct market failures in the education and training sectors, as shortages for both skilled and unskilled workers began to emerge. Through the Small-Scale Industries Unit, the PDC organized a course for technicians in the metals industry (PDC Annual Report 1985:15). The Chief Minister, in coordination with FREPENCA, also worked to establish commitments from member firms to not poach workers from each other.  

Perhaps the best-known PDC initiative was the establishment of the Penang Skills Development Corporation (PSDC).  

Given growing labour shortages, the PDC talked to the local university and private colleges to provide training for technical personnel. However, its authority was limited due to education’s classification as a federal responsibility.

---

57 Interview with Danny Goon.
58 No less than four officials I spoke to claimed that it was “their” idea.
Thus, the PDC, after extensive consultation with MNC managers, set up the PSDC as an informal 'training' institute, with a mandate to provide technical training to high school graduates and retrain workers in the electronics industry. Twenty-six 'founder' companies, employing some 44,000 workers, had input into the eventual structure of the Centre (PDC 1990:51, PSDC 1990:26).

As a result, the PSDC is largely industry-driven and client companies pool their resources, including equipment, and provide training on industry-specific issues (PSDC website59). The PSDC thus acts to reduce information externalities by providing a forum for identifying training needs for the manufacturing sector as a whole. Originally providing the PSDC with land and a start-up grant, the PDC also lobbied the federal government to provide a double tax deduction for contributing companies (Rasiah 2001:177).60

Despite its evident success, this initiative was confined to training technical personnel and was not sufficient to offset imbalances in the federal government’s education policy.61 During the 1980s, the quality of university education was affected by the quota system and the emigration of large numbers of university-age students.62

An Innovative Institutional Environment?

In spite of the progress being made at fostering links between MNCs and local firms, there were no links with the local university, Universiti Sains Malaysia (USM). Indeed, in spite of the electronics industry’s presence in Penang since the early 1970s, USM did not have an engineering faculty until the late 1980s.63 The federal government’s eventual decision to set up an engineering faculty was not carried out with consultation of state government

60 Interview with Boonler Somchit, Executive Director, PSDC, Penang (24/02/2004).
61 A review of Penang’s human resources found that there was a mismatch between the graduates produced and labour market demands. Enrolments at USM were biased towards arts and humanities at the expense of more technical subjects like engineering and applied science. Courses were too theoretical, students were not adequately exposed to up-to-date technology, and they lacked crucial industrial skills. As a result, new graduates required extensive on the job training to be ready for the workplace (PSDC 1990:19-20).
62 Interview with an industry observer, Penang (February 2004).
63 In line with the federal government’s directive of each university having a specific disciplinary focus, USM was geared to science and research, particularly pharmaceutical studies. Interviews with Molly N.N. Lee, Associate Professor of Educational Studies, USM, Penang (17/02/2004).
authorities, and its characteristics precluded significant interaction with the electronics industry.\(^{64}\)

That said, the university did make attempts to provide specialist technical and research services through its Innovation and Consultancy Centre. Given the legislation of the time, universities were legally barred from profit-making, so the Centre was set up as a formal channel through which to offer commercial services. Established in 1981, the Centre was USM’s first attempt to engage with local firms, and offered ‘consulting, research and development, testing/evaluation, extension courses for employees... and the hiring of equipment’ (Ratnalingam and Singh 1993:39).

The Centre provided some testing and consulting services to the manufacturing sector, but was hampered by the engineering faculty’s late establishment and remoteness. By 1990, it had undertaken more than 100 contracts and raised some RM 7 million, mostly in the areas of pure sciences, pharmacy, and environmental management. The Centre also tried to act as an incubator for local companies, but their development was constrained by their unwillingness to invest in R&D and the shortage of venture capitalists. Interestingly, the Centre received very little state government support.\(^{65}\)

Thus, the PDC continued to enact a variety of policies aimed at attracting investment and building up the capabilities of local firms. While the Corporation did not directly subsidize firms, it played a key facilitating role between domestic enterprises and MNCs. Furthermore, due to its greater proximity to investors and firm owners, the PDC was in a position to pressure the federal government for key policy changes.

**Outcomes**

Over the course of Lim Chong Eu’s tenure, Penang’s manufacturing sector grew quickly and consistently. As Diagram 5.1 shows, the number of firms in PDC industrial areas

\(^{64}\) The faculty was actually established in the adjacent state of Perak to cater to the tin-mining industry; and the engineering courses concentrated on mechanical and civil engineering, as opposed to electronics engineering. Interviews with Francis Loh and Othman bin Sidek, Dean, School of Electrical and Electronic Engineering, USM, Penang (30/03/2004).
increased at a steady pace during the 1970s and early 1980s, before growing rapidly after 1987. The electronics firms comprised a relatively small portion of the total number of firms, although their presence was key for a significant number of enterprises in the metal product, plastics, and packaging sectors. However, in terms of the total workforce in the state’s industrial parks, the electronics sector accounted for almost half of the total (Diagram 5.2).

Regarding the electronics industry, investment and jobs grew quickly during the first half of the 1980s (Rasiah 1989a:51). By 1984, the electronics sector consisted of 38 facilities and employed 30,500 people (Diagrams 5.1-2), and Penang had the most offshore semiconductor assembly plants in the developing world (Rasiah 1988:25, Salih et al. 1989:375).

However, the semiconductor market crashed in 1984, with prices for key components plummeting. The effect was felt in Penang somewhat later, as employment contracted from its 1984 high of 30,500 people to 23,000 in 1987. That said, there were no major closures, and National Semiconductor established a lower-end wafer fabrication plant in Penang in 1987.

Diagram 5.1

Sources: ISIS/PDC 2001:7.21, Rasiah 1989b:68

---

Interview with R. Ratnalingam, former Director, Innovation and Consultancy Centre, USM, Penang,
After 1988, investment in the electronics industry picked up again. In part, this was due to the effects of the 1985 Plaza Accord, which made the currencies of the NICs (except Hong Kong) and Japan appreciate considerably. In addition, Korea, Taiwan, and Singapore lost their General System of Preferences status in 1988, which prompted them to invest in Malaysia to avoid trade penalties (Rasiah 2002a:114).

Diagram 5.2

![Diagram of Employment in PDC Industrial Areas (1970-1990)](image)

Sources: ISIS/PDC 2001:7.21, Rasiah 1989b:68

The 1984 crash was important because of the changes it caused in the industry. Competition increased dramatically, with firms investing more in R&D and seeking to upgrade their production processes to cope with constantly evolving technologies. This encouraged innovation, increasing yields and lowering costs and, in turn, boosting demand (Salih et al. 1989:388).

These changes also required greater automation, pushing MNCs to establish ties with local companies to procure customized tools, machinery, and parts. Furthermore, the need for reduced lead times and detailed communication meant that the proximity of supplier firms was crucial (Rasiah 2001:170). This trend was bolstered by cost reduction methods introduced by MNC affiliates, such as Just-In-Time, which required them to reduce inventories and outsource more activities (Rasiah 1989:51).

These developments contributed to the emergence of a group of small and medium-sized local companies. Actually, the 1980s was to prove the most fertile period for the establishment of successful domestic enterprises such as AKN, Eng Tech, LKT, Wong Engineering, and SDKM. By 1985, some 35 firms employing 2,400 people provided supporting services to the electronics sector (Narayanan and Rasiah 1992:93). This encompassed operations such as precision engineering, metal stamping, plastic moulds, manufacture of automation systems, and chemical products. By the end of the decade, the cluster had grown to 45 firms (Rasiah 2002:110).

However, while Penang continued to attract FDI and multinationals with their ensuing job creation and economic growth, the structural limits of the MNC-led industrialization model began to emerge.

While the state’s manufacturing sector grew very quickly, it also narrowed substantially. In 1968, Penang housed firms engaged in the production of apparel, textiles, basic metals, fabricated metal products, and food and beverages. By 1990, the manufacturing sector consisted principally of electronics production and textiles. While undeniably a source of employment, this also exposed the state to the vicissitudes of international market prices for a reduced number of goods.

The industrial structure of the electronics sector was also unbalanced. While a group of local electronics firms had emerged, the electronics sector still consisted of a large group of big MNCs and a set of smaller domestic firms who relied exclusively on them for business.

Due to the onerous technological and capital requirements of the electronics industry, it also remained largely segregated from the local economy. In 1990, foreign firms accounted for 90 per cent of the equity in the electronics sector (ISIS/PDC 1991:7.3). While linkages began to be established with local companies, the extent of local sourcing was still quite low by the end of the 1980s. Thus, by 1989, MNCs in PDC industrial parks obtained only 12 per cent of their raw materials locally and a further 20 per cent from other companies in
the FTZs.\textsuperscript{66} Similarly, in 1987, a mere 17 per cent of capital goods for the electronics sector were sourced locally (ISI/PDC 1991:7.20).

In addition, while the PDC did play an effective intermediary role during the 1980s, there did not appear to be a thought-out approach to SMEs. Its initiatives spoke highly of its efficiency and institutional capacity, but not its vision. A review of Penang’s manufacturing industry found out that ‘there were no special provisions for small-scale or resource-based industries within the state’s industrial programme’ (Chang 1984:7.4). It would also appear that support was restricted to firms in PDC industrial parks, or those with personal connections to the state leadership. Thus, a Penang State Government survey conducted in 1991 found that more than 40 per cent of known SMEs in the manufacturing sector were working in improper facilities (ISIS/PDC 1991:7.7).

This led industry observers to comment that ‘nobody is saying we should chase away the FTZ investors; they have a role to play but the same incentives and priorities should also be given to the local small and medium industrialists’ and ‘the PDC should give a bigger push to the small and medium size industrialists to supplement the role of the foreign investors’\textsuperscript{67} (The Star 04/10/1987).

Thus, after some 20 years in power, the Penang State Government’s drive to attract investment to, and nurture the development of, the electronics sector had brought many benefits. In 1990, the state enjoyed a per capita income some 20 per cent above the national average. Its manufacturing sector accounted for 46 per cent of GDP, and the state’s industrial parks housed some 500 firms, which employed almost 120,000 people (ISIS/PDC 1991:1.9,7.19).

That said, it must also be noted that Penang’s rapid, successful industrialization was not matched by greater fiscal responsibility. Indeed, in 1991, the federal government only allowed the Penang State Government to keep a mere one percent of the US$ 397 million in revenue that its successful industrialization drive generated (Churchill 1995:65).

\textsuperscript{66} Many of these purchases would be from foreign supplier firms, although some would be from local companies.

\textsuperscript{67} Martin Khor, Director of the Consumers’ Association of Penang and Yeoh Seng Hooi, SAMENTA (a now-defunct SME association) Coordinator, respectively.
And, while Penang’s development had been prodigious, Lim Chong Eu’s 21-year tenure came to an end in 1990. His seat was successfully contested by the Chair of the largely-Chinese opposition party DAP, Lim Keat Siang. In spite of this, Barisan Nasional and Gerakan retained control of the state, and the Chief Minister’s post passed to Lim’s Political Secretary, Koh Tsu Koon.

**Summing Up**

Thus, over the course of the 1980s, the Penang State Government continued to pursue the broad vision for development that it had laid out the previous decade. Despite a less comfortable national context, the Penang State Government was still able to preserve a measure of political and institutional autonomy. It sought to capitalize on its low costs, good infrastructure, and responsive institutions to foster economic transformation.

The PDC remained the lead institution for the state’s economic development, implementing a range of market-complementing policies. While its priority was attracting foreign investment and providing follow-up services to investors, the PDC began to act on various fronts to correct market failures. These measures were made possible by the high level of communication between the PDC, MNCs, and local firms. The PDC made great use of its proximity to, and legitimacy with, local firms which entailed access to information regarding market and policy failures. Due to this, the PDC was able to successfully lobby the federal government for key policy changes.

However, while this communication or ‘embeddedness’ – when coupled with the PDC’s high degree of institutional capacity – was remarkably effective, it is important to note that it was not institutionalised. The PDC’s Unit for Small Industries disappeared after several years, and most of the matchmaking depended on personal connections.

In addition, most of the self discovery initiatives funded by the PDC were state-led, rather than initiated by the private sector. And, over time, the Corporation began to fund more commercial viable ventures, rather than those oriented at reducing information costs for
new areas of activity. However, the Corporation was disciplined about phasing out non-performing firms, and did not get locked into funding non-viable enterprises.

Despite its successes, the Penang State Government began to confront the limits of what it could do during this period. Crucial decisions, particularly regarding investment incentives, university education, and university-industry linkages lay outside the scope of its constitutionally-mandated powers.

Notwithstanding this, the window of ‘locational opportunity’ closed and Penang consolidated its reputation as a national and regional centre for manufacturing over the course of the decade. Its attributes remained attractive to MNCs, and in spite of the economic downturn, Penang’s firms were able to successfully cope with the industry’s increasing technological requirements. The electronics sector continued to expand, particularly towards the end of the decade.

In contrast, the elements for effective state or private-led development had not yet come together in Karnataka. The Karnataka State Government had virtually no contact with the relevant sections of the private sector. However, the foundations for the province’s competitive advantage were being laid, as a core group of local entrepreneurs began operations in the state, and the first international investors made flagship investments. In addition, Karnataka benefited from the actions of key Central Government bodies that sought to support these developments rather than hinder them.

**Obsolescence? (1990-2005)**

During this period, the institutional underpinnings of Penang’s developmental state eroded. The Penang Development Corporation’s outstanding bureaucratic capacity was lost and, due to political developments at the state level and growing centralization at the national level, its flexibility was greatly reduced. Most crucially, communication with the local private sector ended. While the PDC successfully promoted other sectors, it missed the opportunity to help local firms deal with increasing levels of competition in the electronics
sector. While once promising, its attempts at fostering industrial-technological transformation foundered.

The Political Context

Penang’s new Chief Minister, Koh Tsu Koon, had credible leadership credentials. A prominent specialist in Chinese education, he, after joining Gerakan in the early 1980s, rose through the ranks to become Lim Chong Eu’s Political Secretary (Gerakan website\(^\text{68}\), The Star 27/10/1997).

However, Koh had to contend with a significantly different political panorama than his predecessor. First, the growing centralization of power under the Prime Minister began to affect Penang. According to a former state government official ‘Previously there was not strong leadership at the Federal level, and thus Penang had a role. When the Federal government took control, it [Penang] lost autonomy...KL took the lead and Penang became a backwater.’\(^\text{69}\)

Second, this was reinforced by the manner in which Koh assumed power. Rather than negotiating terms of entry into a coalition as Lim was able to, Koh was appointed by the Prime Minister and thus was there at ‘Mahathir’s pleasure’. This different power relation was reinforced by Koh’s relative youth, lesser political stature, and less ‘personal’ relationship with Mahathir.\(^\text{70}\)

Furthermore, unlike in the past, Gerakan was only able to retain the Chief Minister’s seat due to UMNO support - which was not unconditional. In 1992, the post of Deputy Chief Minister was created and given to an UMNO official who, incidentally, was also the Head of PERDA (New Straits Times 02/02/1994).

\(^{69}\) Interview with a former state government official, Penang (April 2004).
\(^{70}\) Interview with a former state government official, Penang (April 2004), and a political observer, USM, Penang (April 2004). Following norms established in the 1960s, the Head of Barisan Nasional and, by extension, UMNO, ultimately approve the selection of Chief Ministers.
This subordinate position was reinforced by Koh’s position as Vice-President rather than President of Gerakan. In addition, the party was now less united, with several groups vying for power. Impugned for a lack of leadership, Koh has faced calls to resign from several prominent Gerakan officials (The Star 07/02/1999). As would be expected, Koh is constantly compared to his predecessor, and often found lacking. In the words of a state government official, ‘Lim had a vision, drive, dynamism, and status as one of the early leaders of the Alliance...this is different with Koh Tsu Koon’.

Gerakan’s effectiveness has also been limited by bids from other parties to claim leadership of the state. Growing migration and higher birth-rates increased the state’s Malay population, translating into greater support for UMNO, particularly on the mainland. On one hand, UMNO assemblymen have called for more attention to be paid to the promotion of Malay interests in the state. On the other, UMNO has had to resist calls from its backbench to occupy the Chief Minister’s seat (The Sun 09/08/1995, New Straits Times 03/04/1996). Instead, UMNO has demanded stronger representation on the State Executive Council and has also attained control of the mainland local government (The Star 22/04/2002, Goh 2002:150-152).

MCA, for its part, has always seen Penang as its own and seeks to bolster its power within BN through leadership of a state. Thus, MCA has acted as a *de facto* opposition party, levelling criticisms at the state leadership on a wide range of issues. These calls have

---

71 The Party President has, since 1980, been Lim Keng Yaik, a senior member of the Perak state government. However, Lim Chong Eu, due to his position as a founder of the party and leader of a state government, remained its *de facto* leader until his retirement. In contrast, Koh saw off a challenge for leadership of the Penang branch of Gerakan by his Vice-Chairman, Goh Cheng Teik, in 1999. While Koh successfully retained power, Goh, along with two state assemblymen and 400 supporters, withdrew from the party (Liow 2003:2, Asiaweek 25/02/2000).

72 Interview with a state government official, Penang (April 2004).

73 The decline in effective political capital has led some Penang observers to speculate that it would benefit Penang to have a *Bumiputera* Chief Minister, who would then be less politically vulnerable and be able to implement policies more freely. Interview with a political observer, Penang, (February 2004).

74 On one occasion, this prompted Abdullah Badawi to state that such a move would result in a mass defection of MCA and Gerakan assemblymen to the opposition in protest.

75 ‘There are two municipalities and UMNO runs the mainland like its own’. Interview with Toh Kin Woon, State Executive Councillor, Penang State Government, Penang (02/04/2004).

76 This is more useful than the control of the federal ministries that it receives as a member of BN. Interview with Lee Kam Hing, and The Star (02/05/1999) and The Sun (27/09/2002).
increased after MCA’s revival of political fortunes in 1995, and the crossover of two Gerakan assemblymen to MCA.77

In addition, Gerakan has also come under attack from the opposition party DAP, which has capitalised on criticisms regarding controversial infrastructure projects, the cost of some of the PDC’s commercial ventures, and the alleged lack of low-cost housing (New Straits Times 08/08/1995, The Star 22/04/2002 07/06/2002).

The Institutional Context

Federal Government Institutions

As Chapter Four argued, the economic crisis of the mid-1980s resulted in a rolling back of the Malaysian state’s role in the economy. Rather than attempting to directly own and manage industrial corporations, the state sought to develop a more enabling policy framework, as laid out in the Industrial Master Plan. As part of this effort, the Ministry of Trade and Industry, along with other agencies, began to set up regional offices in major cities, resulting in a crop of new Penang-based federal bodies. While boding well for increased policy responsiveness, their effectiveness at fostering industrial upgrading has been limited by a series of considerations.

First, these regional offices were set up comparatively late. While the Malaysian Industrial Development Agency (MIDA), the Malaysian Industrial Development Finance Corporation (MIDF), and the National Productivity Corporation (NPC) were founded in the 1960s, their Penang-based offices were not created until after 1990. Similarly, while SMIDEC (also under MITI) was set up in 1996, its Penang branch was not established until 2002.78

This was a grave institutional oversight, given the importance of proximity for good policy dialogue and Penang’s centrality to the country’s economic health. It also meant that until

77 Incidentally, one was Lim Chien Aun, Lim Chong Eu’s son. The Star (23/07/2002) and Khoo (2000).
78 Furthermore, given the primacy of Kuala Lumpur-based organizations, regional offices do not attract the best staff. Most officials I met were young, inexperienced, and educated in small, local universities. One official confided that ‘being away from headquarters in a small office is not great for my career’. Interviews with officials from MIDA, MIDF, SMIDEC, SIRIM, the Japan-Malaysia Technical Institute, and the Human Resource Development Council, Penang (February-April 2004).
these offices were set up, firms seeking grants or proposals had to travel five hours to the
capital to get information. In the words of a federal government official ‘Kuala Lumpur is
too far [from Penang]. Rafidah Aziz [the head of MITI] doesn’t do domestic work. Kuala
Lumpur is thus too detached’. 79

In addition, these federal institutions are unable to formulate a vision of Penang and its
needs. At one level, it would appear that federal officials do not place a great deal of
importance on Penang’s regional specificities. 80 However, they also have very little
autonomy to depart from national policy thrusts. While there are quarterly meetings of
federal agencies at the Penang branch of the Economic Planning Unit, the Unit’s main
emphasis is on physical infrastructure projects and preparations for submissions to the
Malaysia Plans (SERI 2001a:25.15). 81

As a result, the Penang-based federal institutions have varying levels of institutional
capacity and proactiveness. Some, like MIDF, appear to have effective marketing policies
through holding seminars, getting client referrals, and visiting companies. 82 However,
others display lower levels of capacity. 83 Thus, there are frequent criticisms of the low level
of technical expertise among federal government agencies. 84

The effectiveness of these institutions is also compromised by a legacy of mistrust between
SMEs and the federal government. Officials from MIDA, HDRC, and SMIDEC all

79 Interview with a senior federal government official, Kuala Lumpur (12/05/2004). In addition, many
Penang-based federal institutions actually cater to the ‘Northern Region’, which comprises the states of
Penang, Kedah, and Perlis. Thus, with the exception of MIDA and MIDF which are on Penang Island, the rest
of the agencies are on the mainland to enable easier access from neighbouring states. While understandable
from a ‘regional’ viewpoint, this means that these institutions are still rather inaccessible for companies in
most free trade zones.

80 ‘Penang is not that different from other states’. Interview with a MIDA official, Penang (06/04/2004).
81 The officials that I interviewed had very little implementation responsibility, as all projects and applications
were approved at headquarters in Kuala Lumpur. Rather, their roles were predominantly to facilitate and
provide information to potential clients. The officials all confirmed that they did not discuss policy issues
directly with their colleagues from other federal institutions in Penang. Rather, they channelled information
back to their headquarters, which would then be discussed in meetings between agencies in Kuala Lumpur.

82 Interview with a MIDF official, Penang (06/04/2004).
83 The MIDA official I interviewed was unsure of investment incentives and policies of competitor countries
such as Singapore and Taiwan, and stated that his branch had no performance targets or benchmarks. The
HRDC official did not know the full range of courses that his organisation funded and the SMIDEC official
stated his organization carried out no outreach work, stating that Penang-based companies ‘know we are here,
and they should come to us’. Interviews with: a MIDA official, Penang (06/04/2004); an HDRC official,
Penang (24/03/2004); and a SMIDEC official (05/03/2004).
84 JICA (2001:3.35) and interviews with Firms A,C,D,E, and F, Penang (March-April 2004).
confirmed difficulties in approaching and working with SMEs. This can also be complicated by communication problems between Chinese firm owners and Malay government officials.\(^85\)

Thus, while the federal government has moved to decentralize its agencies throughout the country, this has not automatically resulted in more responsive policy-making to Penang’s benefit. Federal government institutions in Penang are compromised by their middling levels of capacity, limited attention to the state’s specificity, and low levels of autonomy.

**State Government Institutions**

*The Penang Development Corporation*

Under Koh’s leadership, the Penang Development Corporation has retained its image as a technocratic, professional institution. Thus, in spite of low levels of revenue, Penang is one of the few state governments that, with federal government aid, avoids deficit spending (Anuar 2000:89). It has also been rated first among state governments for the quality of its development projects, and received commendations for good project implementation (The Sun 20/02/2003, New Straits Times 07/03/2004).

Despite relatively good ratings vis-à-vis other government agencies, the Penang State Government and the PDC have become ‘complacent’ and have not evolved in line with new challenges.\(^86\) According to a state government official:

> The 1970s was characterized by path-blazing, driven by new things. Industrialization was new. In the 1980s, activity shifted towards townships, with urban renewal and renovation. In the late 1980s and early 1990s, it [the PDC] became middle-aged. It was merely sustaining the development process, and there

---

\(^{85}\) While senior officials have good command of English, more junior staff do not and there have been communication problems between Chinese and English-speaking SMEs and Malay-speaking Federal government officials. Interview with an industry observer, Penang (February 2004).

\(^{86}\) Interview with Firm D, one of Penang’s top ten domestic firms, Penang (17/03/2004).
were no more growth areas. It was not clear what they were going into... Penang’s engine was cut off in the mid-1980s, and has been coasting ever since.87

A senior state government official observes:

There has been no restructuring of the PDC. It was okay as an SEDC during the 1970s, but today there is a lot of competition and the PDC has not scored too well. Measuring the PDC against other SEDCs is not that useful as they are hardly industry best practice. They are sticking to the sale of land, and forwarding requests to the federal government... There is no road-map for development. The region needs to diversify into manufacturing, software, and services and also education and tourism. Has the institution restructured along with this? It must be a player, but it says that is not what it is into doing...the PDC has been too laid back.88

A variety of factors have affected the PDC’s effectiveness. First, its autonomy was seriously eroded over the 1980s and 1990s. This is particularly the case with regards to revenue. Appeals to include additional transfers to state governments on the basis of the taxes they raise for the federal government have gone unheeded.89 Thus, a senior state government official states:

We would want greater decision-making in terms of approvals for investments, other incentives...even if standards are still monitored from the centre... too much is decided at the centre to the detriment of local needs. We would also like a formula so we can get back some of the money that we generate for the centre. As the centre knows, greater economic autonomy allows greater political autonomy.90

In addition, lower echelons of the PDC have been affected by declining levels of institutional capacity. The FREPENCA representative states:

I like to think that the government at the highest level responds very well. But you cannot keep running to the Minister every other month. At the middle management

87 Interview with a state government official, Penang (March 2004).
88 Interview with Toh Kin Woon.
89 Interview with Chet Singh.
90 Interview with Toh Kin Woon.
level things fall a bit flat. Local management is not good enough, and they can’t be bothered.\textsuperscript{91}

Furthermore, the lack of staff with real technical expertise and awareness of industry trends is beginning to be felt. This observation is frequently voiced by businessmen, academics, and PSG officials.\textsuperscript{92} In part, this is due to the retirement of the original PDC staff and the appointment of new personnel on the basis of federal government policies. According to a senior PDC official:

There was a low turnover in the PDC, with an average 17 year tenure...however, there is now a thin line of veterans. It has completely changed in the case of young people, and it [the PDC] has more features now of a standard government department.\textsuperscript{93}

Thus, despite the PDC’s reputation, the institution began to lose its autonomy, committed staff, and drive. Due to greater centralization, increasing political interference, and less meritocratic recruitment, it began to resemble other government agencies, with limited bureaucratic capacity and innovative ability.

**Private Sector Institutions**

Over time, a variety of intermediate institutions have formed as a means of articulating the interests of Penang-based manufacturing firms.

Most of the MNCs based in Penang are large concerns with formidable technical capacity and resources. These firms have a business association, FREPENCA, to represent their interests.\textsuperscript{94} However, most of its members have the technical and legal expertise to obtain concessions directly from the state and federal governments, and do so.\textsuperscript{95}

\textsuperscript{91} Interview with Danny Goon.
\textsuperscript{92} Interviews with Finn D, Low Swee Heong, Chief Operating Officer, Collaborative Research and Resource Centre (CRRC), Penang (25/02/2004), and Gan Ee Kiang, Director, Unisains Holding, Penang (08/03/2004).
\textsuperscript{93} Interview with Mukenden Menon.
\textsuperscript{94} There are other associations that represent international investors. For example, the Malaysian International Chamber of Commerce represents some 80 large international firms in Penang, of whom about half are in the manufacturing sector. The Malaysian-American Electronics Association also represents large electronics
Thus, while multinationals have an established mechanism for articulating collective interests, and the size and leverage to approach government institutions directly - the same cannot be said for local companies. There is no intermediate association that represents Penang’s estimated 700-800 SMEs in the electronics sector and supporting industries.

The Penang State Government has quarterly meetings with the Joint Chambers of Commerce, comprised of the ethnically-based Chambers of Commerce and the Federation of Malaysian Manufacturers. However, the ethnically-based Chambers of Commerce have very little presence in the manufacturing sector.96

In particular, the Penang Chinese Chamber of Commerce (PCCC), which could be expected to represent the manufacturing sector, is comprised of firms in the construction, retail, service, and textile trade. Membership is plummeting, down to 1,000 members from 3,000 three years ago, and only an estimated 100 members are in the manufacturing sector. In addition, most of these are also members of the Federation of Malaysian Manufacturers (FMM).97

The FMM is the most visible and proactive business association in the manufacturing sector in Penang. Originally drawing most of its members from large domestic companies, it has now turned to aggressively recruiting SMEs. The FMM chairs the only forum that brings together state and federal institutions to discuss technical issues facing SMEs.98 It also carries out surveys of the manufacturing sector, has produced a comprehensive business guide for SMEs, and also offers a range of courses on human resource and

---

96 Both the Malay and the Malaysian Indian Chambers of Commerce have members from each group's traditional economic niches. In the case of the Malay Chamber of Commerce, this is in the construction, services, and retail sector, and in the case of the Malaysian Indian Chamber, this is the spice, textile, and scrap metal trades. Neither have a significant number of members from the manufacturing sector. Interviews with Raffic Haji Mohammad, Honorary Secretary, Malay Chamber of Commerce, Penang (25/03/2004) and N. Ramanathan, President, Malaysian Indian Chamber of Commerce, Penang (10/03/2004).
97 Interview with Cheah Mei Lin, Executive Secretary, Penang Chinese Chamber of Commerce, Penang (24/02/2004). ‘The Penang Chinese Chamber of Commerce has lost influence. The big boys negotiate directly with the government. It is actually a disadvantage to be associated with them.’ Interview with Lee Kam Hing.
management topics. In addition, the Federation has proven adept at handling the media to pressure the state government on particular issues. However, the Federation only has about 250 members in Penang, of which about 150 are SMEs, and not all of these are in the electronics sector.\(^99\)

Thus, the greater part of manufacturing SMEs in Penang do not belong to an association, and are too small to approach state and federal bodies directly. According to an industry observer, ‘Chinese enterprises are not interested in contact and divulging information is seen as dangerous. Thus, there is no way for their interests to be articulated’.\(^100\) It is possible that some of these firms are members of traditional clan associations. However, clans have rather different role and are less oriented to discussing technical issues.\(^101\)

The lack of effective intermediary associations was made more visible once Lim Chong Eu retired from the political scene. Without his personal connections to local firms or an organized collectivity to act as an intermediary, communication between the PDC and domestic firms all but stopped.

**Policies**

**Federal Government Policies**

As discussed in Chapter Four, the federal industrial policy framework changed in important ways after 1985. Rather than undertaking industrial activity directly, the Malaysian state attempted to encourage investment and industrial upgrading through ‘investor-friendly’ policies. Under the Second Industrial Master Plan, the federal government prioritized fostering upstream activities such as R&D and design, and downstream activities such as logistics and distribution. It also laid emphasis on attracting MNC regional headquarters and international procurement centres. That said, the overall framework still faces some challenges, particularly when seen from the perspective of a Penang-based entrepreneur.

---

\(^98\) Confirmed by interviews with FMM, MIDA, and MIDF officials.

\(^99\) Interview with O.K. Lee, Northern Region Representative, FMM, Penang (06/02/2004).

\(^100\) Interview with Terence Gomez.

\(^101\) ‘Clan associations have declined in influence, some are still quite powerful, but they are quiet. They [SMEs] want to be left alone, but the clans are an avenue of protection.’ Interview with Lee Kam Hing.
First, Penang’s ability to foster high value-added supporting industries has not been helped by the federal government’s decision to locate key infrastructure in other states at Penang’s expense.

For example, the Multimedia Super Corridor (MSC) was set up near Kuala Lumpur. The MSC, with leading edge infrastructure, incentives, and no limits on skilled foreign workers would have been a very good complement to Penang’s manufacturing sector. While MSC status was liberalized to include other regions after 2003, before this companies seeking MSC status were required to be physically located in the park, effectively ruling out Penang-based companies.\(^\text{102}\) Had these benefits, not to mention infrastructure, been extended earlier to companies in Penang, it could have helped foster supporting sectors such as software, logistics, and marketing, as well as attracted MNC regional headquarters and procurement centres.

In 1996, the federal government also set up the Kulim High Technology Park in the neighbouring state of Kedah.\(^\text{103}\) The Technology Park, which is the second largest in Asia, focuses on electronics, semiconductors, photonics, and biotechnology. It houses one of the country’s four government-supported foundries, Silterra, and a branch of MIMOS, the federal research institute for ICT and microelectronics. The Park is just 45 km from Penang and has lured high-profile investors out of the state. Intel, Celestica, and Fuji have plants there and Infineon, Europe’s second-largest semiconductor firm, invested US$ 1 billion in a manufacturing plant in 2004. It has also attracted investments from successful local firms such as LKT, Wong Engineering, and BCM (FEER 18/12/1997, Tajuddin 2005:6).

Similarly, in 1997, in spite of six years of campaigning by the Penang State Government, the federal government decided not to build a new international airport in that state. Rather, it proposed investing US$ 2 billion to build a new airport in Kedah, which relied less on

\(^{102}\) Prior to this, Mahathir had been petitioned to extend MSC-status to Penang, which he refused (Huff 2002:256).

\(^{103}\) With the Kedah State Development Corporation.
tourism and manufacturing, and already had two airports. Penang’s airport was to be downgraded to cater exclusively to regional air traffic (Asiaweek 05/09/1997). However, the East Asian Financial Crisis and opposition from industrialists caused the plan to be put on hold.

Investment Promotion

As mentioned in Chapter Four, Malaysia’s incentive structure is somewhat out of date, with too much emphasis on tax incentives to attract firms but not enough on encouraging industrial upgrading afterwards. Most MNCs have received tax-free status already, making tax incentives for investing in R&D redundant. In reality, Penang-based firms require other types of incentives. According to Agilent’s Technology Director:

The federal government is not doing enough. Tax is not a big factor. We are moving forward and the financial world is modernizing. The Malaysian Government needs to understand that tax exemptions are not sufficient. With regard to businesses, if you depend on a tax incentive to be profitable, then you have a bad business model.\textsuperscript{104}

In the words of the CEO of AKN Technology:

Financing is available, as are tax holidays. But the government does not tend to make you feel welcome. …they could also do more. When you are investing US$ 100 million in research and development you need some help, not just a tax holiday.\textsuperscript{105}

Furthermore, foreign firms are not eligible for research grants. In this regard, Malaysia is lagging behind competitor countries such as Singapore and Taiwan, where grants are made available to firms regardless of their nationality. In a context where MNC affiliates need to

\textsuperscript{104} Interview with Yoon Chon Leong, Director, Corporate Relations and Technology, Agilent Technologies, Penang (31/03/2004).

\textsuperscript{105} Interview with B.L. Ooi.
convince their headquarters to let them undertake a task locally, grants, specialized infrastructure or some demonstration of government support can be crucial.\textsuperscript{106}

In addition, the federal government is not particularly agile with regard to Penang’s requests. A state government official states:

When... incentives are asked for, the response is that Penang is mainly Chinese and well-developed. Thus, the response is much slower...this is increased by the declining quality of the bureaucracy, and a decreasing sensitivity to the region’s needs. When we go to KL and bring up immigration or incentive issues, even if the response is favourable, it is too slow.\textsuperscript{107}

This has resulted in the loss of some prime investments. For example, the firm 3M was deliberating whether to set up an innovation centre in Singapore or Penang in the early 1990s. The company requested both countries to develop a plan for a tailored Master’s course to secure a steady supply of key technical staff. The Malaysian Government did not reply, and the Singaporean Government offered to set up the course within three months. As a result, 3M located its centre in Singapore.\textsuperscript{108}

\textit{Access to Finance and R&D funding}

Furthermore, Penang-based companies, particularly smaller ones, face considerable obstacles in obtaining finance as well as obtaining grants for R&D.

First, there is no one government agency that gathers all initiatives available to small firms. According to an SME expert, ‘SME support is very dispersed and disorganized. It is oriented to Bumi[putra]s, oriented to retail markets, and KL-based. The majority of SMEs do not receive any government assistance.’\textsuperscript{109}

\textsuperscript{106} Interviews with Low Swee Heong, B.L.Ooi, and Robin Seo.
\textsuperscript{107} Interview with a state government official, Penang (April 2004).
\textsuperscript{108} Interview with a state government official, Penang (April 2004).
\textsuperscript{109} Interview with an industry observer, Penang (February 2004).
In addition to the issues of institutional overlap and poor coordination, there are some important gaps in the incentive structure. On one hand, grants cannot be given to the more successful, publicly-listed companies and the amounts available are too small for large privately-owned companies.\textsuperscript{110}

Conversely, many smaller firms find it hard to access these grants. SMEs find it hard to get funds from the banking sector or government agencies, due to their rather onerous requirements.\textsuperscript{111} Furthermore, many of these procedures take too long for SMEs, which do not have large stocks of working capital (JICA 2001:3.30). As a result, only 10 per cent of applications that agencies such as the Malaysian Industrial Development Fund receive are funded.\textsuperscript{112} In addition, industry observers stated that the available venture capital programs act too much like banks, placing too much emphasis on strict financial criteria, rather than assessing a project’s technological potential.\textsuperscript{113}

Moreover, grants are oriented to research-based R&D, rather than more industry-relevant projects. Industry observers state that there are two crucial areas that require support. The first is to provide funding to local companies to develop prototypes of components that, if successful, can then be marketed to MNCs. The second is to cover the costs of training of personnel from supplier firms in MNC headquarters to learn specific types of applied technology. The financing of these activities have traditionally been seen as the responsibility of MNCs, even though they would aid local firms to undertake more sophisticated tasks.\textsuperscript{114}

\textsuperscript{110} What can I do with RM 2 million? Interview with B.L. Ooi.
\textsuperscript{111} In many cases, firms need to have an established track record, formal accounting systems, all relevant building permits, and collateral. Yet, most manufacturing firms are family-owned and lacking in modern management and accounting techniques, and many do not operate in appropriate areas.
\textsuperscript{112} Interviews with a MIDA official, Penang (06/04/2004) and a MIDF official, Penang (19/03/2004). As the CEO of a small firm states ‘I am actually at the intermediate area, where there is a missing link. Thus, the area needs a system to help SMEs grow, as the government is only looking at the big guys...in terms of implementation of licensing, grants, loans etc it should be made simple and loosened up to smaller people qualify. They should also follow up on legislation and have more fine-tuning to make sure that people don’t slip through holes.’ Interview with Firm E, Penang (03/18/2004).
\textsuperscript{113} Interview with Gan Ee Kiang and Venture Capitalist A, Penang (19/03/2004).
\textsuperscript{114} The Malaysian Government, under the HDRC, traditionally covered 50 per cent of costs, but Taiwan and Singapore are reputed to cover 70 per cent and 100 per cent respectively. Interviews with Low Swee Heong, Boonler Somchit, and Toh Kin Woon. However, the HDRC official that I interviewed stated that as of February 2004, the Malaysian Government would fund 100 per cent.
This ‘disconnect’ is compounded by many SMEs’ mistrust of government programs. Federal government officials lament the low response rate to initiatives among Penang’s SME sector.\textsuperscript{115}

\textit{Skills Provision}

Another area that poses formidable problems for the manufacturing sector in Penang is the shortage of skilled labour. As mentioned in Chapter Three, human resource demands in the electronics sector have climbed significantly in recent years, exposing crucial shortcomings in the education system.

According to Toh Kin Woon,

\begin{quote}
There is definitely a human resource problem. Engineers at local universities are not produced in sufficient quantities...they are not immediately employable. There is a gap with what the industry wants, and it is necessary to spend a year to a year and half to correct this...Help with the design of prototypes, land costs, and even labour costs, are only part of the equation, at the moment you still need the HR base.\textsuperscript{116}
\end{quote}

Industry observers state that many engineering graduates have crucial deficiencies in their command of English, capacity to think independently, and technical competencies.\textsuperscript{117} The most commonly cited cause is the decline in the quality of education under the NEP.\textsuperscript{118} With regard to the NEP, the most persistent comments voiced by industrialists are not about equity or employment quotas. Rather, they are about the effect of the NEP on the availability of skilled labour. According to a local industry observer:

\begin{quote}
\textsuperscript{115} The HDRC official I interviewed stated that their biggest challenge was getting SMEs in Penang to cooperate. Up until 2001, less than half of eligible firms reclaimed money due to them for worker training, amounting to some RM 11 million. The SMIDEC official laments ‘there are so many seminars and workshops that we organize, but still they don’t come’.
\textsuperscript{116} Interview with Toh Kin Woon.
\textsuperscript{117} Interviews with Low Swee Heong and Boonler Somchit.
\textsuperscript{118} ‘The problem is that USM is publicly funded...Under the NEP, the character of the university changed. Many good people left, and you had young, inexperienced people being appointed. It lost touch with industry and became more theoretical. There is R&D but it is of little practicality’. Interview with an industry observer, Penang (February 2004).
\end{quote}
They [the government] are not so strict about quotas for Bumis. In any case, most of the production workers are Bumis, and at the managerial level, Bumis tend to concentrate in the Human Resources and Security Departments. They are happy with that. What really screwed us was the decline in skilled labour under the NEP.\textsuperscript{119}

In addition to quality considerations, the industry must deal with insufficient numbers of graduates with a technical background. This is particularly pressing for students in the fields of electronics, mechatronics, and software, as well as engineers with postgraduate degrees (SERI 2001b:5).\textsuperscript{120}

However, this has been ameliorated somewhat by the liberalization of the private higher education sector. While on one hand, this has resulted in the proliferation of many institutions of mediocre quality, it has also given rise to some very good institutions.\textsuperscript{121} Some have emerged to play a crucial role in interacting with industry, such as the Kuala Lumpur-based Multimedia University.\textsuperscript{122}

In addition, the federal government has moved quite decisively in the area of technical training, setting up a polytechnic and a joint Japanese-Malaysian Technical Institute in Penang.\textsuperscript{123}

\textit{A Innovative Institutional Environment}

That said, the local university has not been so successful at cultivating contacts with MNCs or local firms in the electronics sector. Industrialists and state government officials frequently state that it is very difficult to engage with USM.\textsuperscript{124}

\textsuperscript{119} Interview with an industry observer, Penang (February 2004).
\textsuperscript{120} Interviews with Firm A, Penang (02/03/2004) and B.L. Ooi.
\textsuperscript{121} Interviews with Molly Lee and Mark Chang, CEO, Jobstreet, Penang (04/02/2004).
\textsuperscript{122} The University has managed to establish ties and a solid reputation with industry through encouraging its faculty to provide consultancies to firms and ensuring constant industry input into its curricula. Its 3,200 undergraduates in electrical engineering and 2,400 students in IT go some way to addressing the deficit of skilled, technical personnel. Interviews with Chet Singh, Molly Lee, Low Swee Heong, Robin Seo, Tajuddin Carrim, Yoon Chon Leong and Professor Hean-Teik Chuah, Dean, Faculty of Engineering, MMU, Cyberjaya (28/04/2004).
This ‘disconnect’ is exemplified in USM’s decision to relocate the engineering department from Kedah to a remote corner of Penang state in 2001. The remoteness of the department precludes contact with firms, particularly SMEs. In addition, the Department needs to increase its approaches to MNCs as, to the present, there are only established relationships with two out of the more than 160 in Penang.

However, interaction between USM and local industry has improved with the University’s corporatization in the late 1990s. Unisains was created to replace the Innovation and Consultancy Centre, and now acts as an incubator and an intermediary between the university and local industry. Thus, the University, through Unisains, offers companies access to its equipment and staff. However, the greater part of its work to date has been in the pharmaceutical sector.

The other federal agency that could provide troubleshooting and technical consultancy for local businesses is SIRIM. However, the Northern Branch specializes in quality assurance and calibration for the local market. Enterprises seeking more technical services for other aspects of production need to travel to its 13 Technology Centres in Kuala Lumpur (JICA 2001:2.4).

Local enterprises also highlighted the need for more protection of intellectual property. MNCs have the resources to protect their products and prosecute obvious instances of intellectual piracy, however small domestic companies do not. Furthermore, the registration

---

123 The Technical Institute, established with aid from Japan, was established to provide a stream of technical workers to Japanese operations in Penang. Interviews with Molly Lee and Zaihan bin Shukri, Director, Japanese-Malaysian Technical Institute, Penang (08/04/2004).
124 ‘The Vice-Chancellor does not see that his major role to make USM successful is to work with industry. His political masters are in KL’. Interview with a state government official, Penang (February 2004). ‘The Vice-Chancellor wants to produce a Nobel Laureate. What for? Why doesn’t he look at industry needs and try to make the economic pie bigger?’ Interview with an industry observer, Penang (February 2004).
125 The Engineering Faculty is on the mainland, near the border with Perak. The drive from the industrial centre of Penang takes some 90 minutes.
126 Interview with Othman bin Sidek, Dean, Faculty of Engineering, USM, Penang (30/03/2004).
127 Furthermore, most of Unisains’ revenue comes from the government, although it does cater to MNCs and SMEs. Industrialists have commented that Unisains concentrates on longer-term consultancies to large firms, and is less willing to provide trouble-shooting services to smaller firms. Rates are comparatively expensive, resulting in many academics being hired unofficially. Other observers state that it has actually just added another layer of bureaucracy to the process of tapping the university’s expertise. Interviews with Gan Ee King, Tan Seang Aun, Othman bin Sidek, and Firm B, Penang (04/03/2004).
of trademarks and patents takes a long time, causing many local firms to forego this process and become even more secretive.\textsuperscript{129}

**State Government Policies**

As before, the Penang State Government has relied on its vaunted client-focus and good infrastructure to attract firms. In addition, it has sought to articulate a more technologically-aware vision for the future and stress the development of its private education sector. However, declining levels of capacity has meant that many of these services were not delivered successfully, and the lack of communication with local firms meant that crucial institutional support for upgrading was not forthcoming.

*Formulating a ‘Vision’*

The Penang State Government, under Koh Tsu Koon, has been proactive in trying to formulate a strategic vision for the state. Following the tradition set by the Nathan Report, the state government commissioned two strategic plans to provide a blueprint for development. The first Penang Strategic Development Plan (PSDP) came out in 1991, to be followed by the Second Penang Strategic Development Plan (PSDP2) in 2001. The Development Plans set out broad-ranging strategic frameworks for the state in the economic, social, environmental, and governance areas.

The Plans provide very good analyses of structural issues that the state faces, but attempts to ensure that their recommendations are followed up have been less successful. This was due, in part, to the fact that the PSG has limited resources for development expenditure and federal agencies in Penang are not beholden to it. During 1999-2003, the state government’s development budget amounted to only 16 per cent of the federal government’s budget for projects in Penang (PSG website\textsuperscript{130}). Furthermore, this planning

\textsuperscript{128} Interview with Firm C, Penang, (12/03/2004).

\textsuperscript{129} One patent broker stated that it took 18 months for the complete process to be carried out, at a cost of some RM 5,000. Interview with Raffic Haji Mohammad.

mechanism is superceded by federal procedures for the Malaysia Plans, which federal agencies are tasked with following.

These factors lead a senior PSG official to state ‘nobody is doing anything about it [the Strategic Plan]. The federal government does not take it seriously. UPEN [The State Economic Planning Unit] channels demands that go into the Malaysia Plan, but there is no vision for Penang.’

Another area where the state government and PDC have been active is the promotion of information technology. In 2002, the Penang State Government unveiled the Knowledge ICT Blueprint, which envisioned the state’s transition from a ‘production’ to a ‘knowledge’ economy. One of its priority projects was for Penang to join RosettaNet, a consortium of 400 electronics firms seeking to establish global standards for manufacturing related e-business, and the PDC worked with the federal Ministry of Trade and Industry to set up the organization’s headquarters in Penang. This may prove to be an important strategic decision as, through their adoption of these standards, Penang’s SMEs will be in a position to cater to MNCs regardless of their location (RosettaNet website, PDC Annual Report 2002:5).

Investment Promotion

The PDC also continued to promote Penang overseas through trips to strategic markets in Europe, North America, and East Asia. The Corporation also began to promote a ‘China +1’ strategy, seeking to encourage investors to diversify their production sites to include Malaysia. The PDC widened the scope of its marketing, targeting non-English speaking European countries and owners of medium-sized companies.

---

131 Interview with Toh Kin Woon. However, one of the more useful outcomes of these exercises was the creation of the Socio-Economic and Environmental Research Institute. Set up in 1997, upon the first PSDP’s recommendation, the Institute has served as the state government’s think tank. It has contributed technical and policy information on a wide range of economic, social, and environmental topics, including the formulation of the Second Penang Strategic Development Plan. As a result, it has become a source of considerable institutional capacity that has helped bolster the state government’s planning machinery, which ‘lacks direction, consistency, and [a] systematic approach’ (ISIS/PDC 1991:17.3).


133 Interview with a PDC official, Penang (13/02/2004) and FEER 17/07/2003.
In February 2005, after considerable lobbying, Penang finally obtained Multimedia Super Corridor status for a swathe of land in its main export-processing zone. This will be helpful for enabling Penang-based firms to: qualify for MSC-related incentives; bring in much-needed skilled workers from overseas; and spur the development of skill-intensive supporting industries such as software and design labs (The Star 08/02/2005).

However, criticisms are now being made of the PDC’s treatment of investors, once an area in which it excelled. For example, there have been complaints about the length of time needed to obtain permits (New Straits Times 09/12/2000), and a foreign investor, resident in Penang for ten years, says of the PDC:

when it comes to the nitty-gritty, there is a marked absence of ‘hand-holding’ for investors to feel sufficiently assured that they are valued customers...the state has definitely not done enough to assist potential investors through the loops and hoops of obtaining the numerous federal and state approvals. While claiming to be a state agency meant to attract investors to Penang, its interest seems to rest on such a narrow band and mind by safeguarding its own interest (like selling off its land) instead of concentrating on investors. The Star (12/11/1999)

According to senior state government official:

For a lot of the industry, the PDC acts like a land-lord. It sells the buildings and does not provide good after-sales service. While it provides better service to some MNCs, this is based on connections and personality. Younger personnel have not been taught how to handle customers. There is too much ‘come-to-me’.134

The CEO of one of Penang’s largest domestic firms states:

My neighbour is the largest Taiwanese company in Malaysia, employing 6,000 people. The PDC does not know who this person is and has never visited him. He feels under-appreciated. Another of my friends, an American CEO, relocated here from Singapore. After 6 months, he still has not been visited by the PDC. In

134 Interview with a state government official, Penang (February 2004).
Singapore, people from the EDB visited him within two weeks to see what he needed.\footnote{135 Interview with B.L. Ooi.}

This is rather more marked for local companies. One frequently voiced criticism regards ‘PDC’s preference towards multi-national companies, which are mostly foreign-owned as opposed to small and medium industries operated by locals’ (NST 9/12/2000) with an industry observer commenting that ‘the Penang State Government focuses on MNCs and not SMEs. They keep coming back to MNCs, but need to look more at local entrepreneurship’.\footnote{136 Interview with Venture Capitalist B, Kuala Lumpur (10/05/2004).}

While contacts with local firms were never very institutionalised, this type of work has been particularly hard hit by declining capacity. An industry observer states that ‘there is less extension work. Now people have to come to the PDC instead of the PDC coming to them. It has no people on the ground’.\footnote{137 Interview with an industry observer, Penang (February 2004).} An industry observer states

The PDC...has not done so well at dealing with industrialists, and has gotten more into urban development with new townships, where there is a lot of money. Manufacturing has been left alone as there is a long gestation period before it starts making money...They don’t foster SMEs as they are not considered ‘stylish’ enough.\footnote{138 Interview with an industry observer, Kuala Lumpur (May 2004).}

\textit{Targeted Infrastructure Provision}

Regarding infrastructure for domestic and local investors, the PDC’s record after 1990 has been rather mixed, as there were still issues with basic infrastructural bottlenecks. The electricity supply has been irregular, with occasional black-outs and an infamous 10-day power outage. In addition, the state government has been unable to secure a steady supply of water for industrial needs (Haggard et al. 1998:16). And, collective facilities to deal with toxic wastes and environmental damaging processes such as electroplating have not been provided.\footnote{139 Interview with Firm F, Penang (02/04/2004).}
In 1994, the PDC inaugurated another industrial park and, in 1995, set up the Technoplex, designed to house more sophisticated and technologically intensive operations (PDC Annual Report 1995:23). Originally promising communal facilities such as research and testing labs, the Technoplex has not been a success. Some five years after its creation, it housed just seven firms. In part, this was due to a lack of incentives for companies to relocate there, and amounted to, in the words of a PDC official ‘just prestige real estate’. 

Furthermore, the PDC has not been proactive in providing different types of facilities for investors. Due to the cyclical nature of the electronics industry, investors have been less interested in buying land and buildings, as opposed to leasing facilities when needed. The PDC undertook to provide buildings for lease only after Singapore and China began to do so (The Sun 25/07/03).

In addition, the PDC has fallen behind other state governments in some areas. While investors in the Kulim High-Tech Park deal with one agency for all building approvals and permits, the PDC has been unable to streamline local government requirements. Firms in Penang have to obtain some 17 permits from a variety of local government institutions before they can operate legally. In addition, only some 10 per cent of the revenue from local taxes levied on firms in the FTZs is reinvested there to maintain and upgrade facilities. As a result, there are insufficient traffic lights, maintained roads, and functioning drainage systems in the industrial parks. In some cases, the PDC expects investors to pay for basic infrastructure such as connections to sewage systems.

The PDC has continued to build factories for SMEs, some of which are reserved for Bumiputeras. While there has been some uptake of these facilities by local companies, many have remained in illegal sites, or opted to purchase land in the private sector. This is due, in part, to the relative expense of PDC land for small companies, in addition to the fact that the land sold is not freehold, but has a 60-year lease.

140 Interviews with a PDC official, Penang (13/02/2004), Robin Seo, and Firm F - both who are in the Technoplex.
141 Interview with Low Swee Heong.
142 Interview with an industry observer, Kuala Lumpur (May 2004) and Firm C.
143 Interview with Firm C.
Self-Discovery

The PDC’s investment portfolio continued to expand, coming to encompass 59 companies. This included 48 wholly-owned, subsidiary, or associate firms, in addition to investments in 11 publicly listed companies, at a value above RM 266 million\(^\text{144}\) (PDC website\(^\text{145}\)). During this time, the portfolio’s composition continued to move away from manufacturing concerns towards real estate, hotel and leisure amenities, and construction. That said, there were a few self-discovery projects in manufacturing as well as investments in industrial parks in Bangalore and Medan\(^\text{146}\).

However, the biggest new area for investment was in supporting industries for the manufacturing sector such as warehousing, air cargo handling, and information technology\(^\text{147}\). In addition, the PDC also made strategic investments in hospitals and private colleges to diversify the state’s economy and make Penang a regional centre of excellence for health and education\(^\text{148}\). That said, the overall performance of the company was mixed, as 17 companies were either dormant or being liquidated in early 2005 (PDC website\(^\text{149}\)). There have, however, been some successes. Schott Glass, a PDC joint-venture established in 1974, has become a profitable industry leader and is now poised to enter the photonics market (The Star 2/12/2003).

Reducing Information and Coordination Externalities

After 1990, the Penang State Government moved to establish formal channels of communication with the private sector. However, these ‘consultative councils’ are characterized by their exclusive membership and short duration.

\(^{144}\) This refers to 2002, when the PDC owned 57 companies (PDC Annual Report 2002:34)
\(^{146}\) Texchem Engineering Plastics, Indo-Malaysian Technopolis, and P.T. Kawasan Industry Harmoni Indomal respectively.
\(^{147}\) PDC-YCH Distripark, Dynaview, and Penang Network Services respectively.
\(^{148}\) Interview with a PDC official, Penang (13/02/2004).
The first, the Penang Economic Council was modelled after the Malaysian Business Council and consisted of 50 members from the public and private sector. It lasted two years (1991-1993) before becoming dormant (SERI 2001a:25.40). Its successor, the Penang Industrial Council consisted of 22 members, including 12 private sector 'leaders', and lasted from 1993 to 1999 before also ceasing operation (New Straits Times 16/01/1993, SERI 2001a:25.40). The latest such body is the Penang Competitiveness Committee (PECO), created in 2002 and consisting of the 'captains of industry and academics' (PDC Annual Report 2002:6). In spite of its bias towards large companies, the Committee was to reach out to smaller firms. A total of two trips to meet SMEs were conducted before being discontinued, and the firm where PECO held its meetings is now dormant (PDC website150).

In an effort to develop Penang’s base of supporting services, the Penang State Government set up two consortia under PECO. The first, the Software Consortium of Penang (SCoPe) brought together 27 Penang-based companies to develop a roadmap for software development in the state and promote locally-developed software (SCoPe website152). The second, the Penang Photonics Consortium (PPC), brought together 17 local companies to offer high-end expertise in opto-electronics (PSDC website153). The photonics consortium was comprised of Penang’s more established firms, such as BCM, Eng Technology, LBSB, Metfab, and Prodelcon. However, the Consortium’s commercial activities were relatively short-lived, as the principal international investor, Komag, withdrew after its subsidiary, Chahaya Optronics, sustained substantial losses and was closed (Komag Annual Report 2004:51). The PDC was unwilling to provide further incentives or investment.154

Other than these initiatives with the larger, more established local firms, the PDC has not moved proactively to help bolster the technical capacity of local SMEs.155 The PSG created the Small and Medium Industry Centre in 1992 to broker contacts between MNCs and local

151 Interview with an industry observer, Kuala Lumpur (May 2004).
154 Interview with Venture Capitalist B, Kuala Lumpur (10/05/2004).
155 However, the PDC, under directives from the federal Ministry of Entrepreneur Development, has placed considerable emphasis on the promotion of Bumiputera entrepreneurs, particularly after 1997. It established an Entrepreneur Development Unit and Entrepreneur Assistance Centre, a database of Bumiputera companies,
companies as well as provide information on government initiatives. At its height, it had two full-time staff and 180 member companies in the metals, electric, and plastics sectors (JICA 2001:7.11). However, it experienced a series of managerial problems, including staff shortages, and is now defunct. Thus, networking between firms has not been institutionalised, and matchmaking has all but stopped. There is no provision of basic market research and no consistent provision of venture capital, which has been offered in ‘fits and starts’. 156

A study team, sponsored by the Japanese International Cooperation Agency (JICA), conducted an in-depth analysis of the electronics sector in 2000-01. The most serious issue that the study found was the need for institutional support to help companies upgrade. Its review of SME support programs found that: local entrepreneurs did not adequately understand the aims of various initiatives; there was an overlap between federal and state government programs; and initiatives were too oriented to high-technology ventures such as IT and biotechnology and not enough to dealing with technical production issues. After studying the industry, MNC practices, and the technological capabilities of local supplier firms, the team recommended the PDC, along with other state government agencies and USM, implement a seven-part action plan to enable SMEs to undertake more complex tasks. (JICA 2001:S-2)

The Plans encompassed: a) a production engineering research and development unit, tasked with providing technical solutions to help firms improve production processes and introduce new technology b) a mobile guidance unit to visit firms’ production areas to ensure best practice c) a committee to carry out market research on future market needs and niches d) a committee to gauge MNC needs for component parts and broker subcontracting opportunities with local SMEs e) an organization to broker orders for inputs like steel to lower prices and reduce transaction costs f) a unit to promote modern business practices g) a unit to provide business consulting services (JICA 2001:S7-11).

as well as a Vendor Development Programme to match-make small Bumiputera companies with MNCs (PDC Annual Reports 1997-2002).

156 Interviews with Firm A, Low Swee Heong, and two state government officials, Penang (February 2004).
To date, none of these recommendations have been implemented, and two of the principal state government bodies charged with its implementation are defunct. These, and other, policy failures led a senior PSG official to state:

There was a missed opportunity to support SMEs – SMEs grew out of the need to provide services and parts and components to TNCs. It was not very difficult. The cost of entry has changed. Now TNC practices have changed. This is a legacy of the early days, when demand was greater than supply.

**Institution-Building**

As a result of the PDC’s declining levels of institutional capacity, other institutions have been created to carry out some of its duties. The Penang State Government set up the Collaborative Research and Resource Centre in 2002. The Centre had three aims, which were to: help local firms access R&D facilities; help small firms form clusters to tap overseas markets; and foster local entrepreneurs.

The Centre had an initial grant of RM 300,000 from the Penang State Government and was housed in USM with one full-time professional. It held workshops on new technologies, set up clusters on integrated circuit design, software, and automation, and attempted to broker relationships between MNCs, local companies, and academics. However, as its Chief Operating Officer states, the CRRC was actually carrying out functions that the PDC itself should be doing. The Centre’s grant ran out in 2005, and it has now ceased to operate.

In late 2004, the PSG created a new agency, InvestPenang, to take over some of the PDC’s functions. The institution, headed by the former PDC Deputy CEO, B.J. Yeang, has been charged with facilitating investment and fostering industrial development, leaving urban development and tourism promotion to the PDC. The Chief Minister’s rationale was the following:

---

157 Interview with an industry observer, Kuala Lumpur (May 2004).
158 Interview with a state government official, Penang (February 2004).
159 Interview with Low Swee Heong.
Despite the tremendous success in industrial development achieved by Penang in the past 30 years, the onset of new challenges from emerging economies like China, India, Vietnam and Eastern Europe, and new initiatives and incentives by our traditional competitors such as Singapore and Thailand has necessitated a new strategy and machinery to sustain and promote investment for Penang. While the PDC has done a good job in promoting industrial investment in the past, it is crucial and critical that Penang now adopts an even more focused proactive, integrated, flexible, pragmatic, and business oriented approach to face these challenges. (The Edge 01/09/2004)

At present, it is too early to tell whether InvestPenang will be able to step around the issues of autonomy, institutional capacity, and excessive focus on international investors that have characterised the PDC.

**Targeted Skills Provision**

However, while the Penang State Government’s industrialization policies have proven less satisfactory, it has been remarkably proactive in fostering the development of its education and training sector – despite the fact that education is a federal responsibility.

The Penang Skills Development Centre has emerged as a dynamic state government institution. Originally started with state government grants, the PSDC has been financially independent since 1998 (Wong 1997:19). Its membership base has expanded to 104 companies that employ some 75,000 workers. Over the period 1989-2000, it held 4,000 training programs for 75,000 students. In addition to providing training to upgrade worker’s skills, the PSDC has also worked to correct some of the deficiencies of the formal education system through its Graduate Re-skilling Program, which works specifically with unemployed graduates.

The PSDC also dramatically increased its institutional capacity by acquiring two specialist institutions, the Institute of Precision Mould and the Malaysian Plastics Manufacturers Association, which has allowed it to emerge as a regional centre for technical training in the
plastics sector (PSDC website\textsuperscript{161}). It also houses the federally-funded Global Supplier Program, which provides training in quality assurance and technical standards to local firms and attempts to match them with MNCs (PSDC website\textsuperscript{162}).\textsuperscript{163}

Industry observers have commented that while the PSDC plays a valuable role in addressing the industry’s need for technically proficient workers, it does not deal with the industry’s need for workers with more post-graduate qualifications. One company owner states:

The PSDC is good for sending people to get technical training in machining, software, and basic stuff. SMIs need people with more specific skills, engineering, more knowledge-intensive stuff, design, and skills on how to be more productive. These are more graduate level issues.\textsuperscript{164}

However, the PSDC also provides training in very specialized areas with institutions such as the Semiconductor Manufacturing Institute in Singapore. It has established twinning arrangements with a variety of universities overseas, and offers a part-time Masters in Micro-electronics with the Multimedia University.\textsuperscript{165}

In addition, the Penang State Government has purchased stakes in several colleges to diversify the state’s economic base and address skill shortages. To date, three of the state’s highest quality colleges - the International Medical College, Disted-Stamford, and INTI College - have been established with participation from the PDC.\textsuperscript{166}

\textsuperscript{160} With the exception of the land and buildings which are provided by the state government at a subsidized rate. Interview with Boonler Somchit.
\textsuperscript{163} However, the Program suffers from a lack of appropriate incentives for MNCs and to date has only successfully matched nine supplier firms with international clients.
\textsuperscript{164} Interview with Firm A.
\textsuperscript{165} Interview with Chuah Hean-Teik and New Straits Times (15/07/1999).
\textsuperscript{166} The Medical College is twinned with Ireland’s Royal College of Surgeons, and channels its graduates into Penang’s health system. The other two colleges offer courses to students in the areas of business administration, information technology, and engineering. Disted-Stamford, which is also partly-owned by Gerakan, has Intel’s former Managing Director as its head and has established links with the Multimedia University to offer diplomas in engineering. Interviews with R. Ratnalingam, former Director, Innovation and Consultancy Centre, Penang (19/02/2004), E.K. Chong, Director, Disted-Stamford College (09/04/2004), and
Gerakan also attempted to set up a distance learning university, and permission was finally given by the federal government in early 2005 (The Sun 28/07/2003, The Star 27/02/2005). In addition, the party has drawn up plans for its own private university to be based in Penang, which would specialize in marine resources, engineering, and pharmaceutical studies.\(^{167}\)

Furthermore, Penang has the only State Government with an Educational Council. The Penang Educational Consultative Council brings together 25 representatives from the education sector to promote education in the state. Regarding further education, it attempts to ensure that private institutions are of acceptable quality and have suitably qualified staff and adequate facilities.\(^{168}\)

Seeking to strengthen the private sector supply of education is a farsighted approach, as the sector is growing quickly and responding well to market demands. In 2001, the private sector encompassed 37 institutions catering to 20,000 students, of which 75 per cent are from Penang.\(^{169}\)

However, there are limits to what the State Government can do. The Education Council’s budget is a mere RM 200,000 per year. As the owner of the country’s largest job portal, Mark Chang states ‘Most of the bigger projects are federal, and there is not much the state government can do. You cannot work for education reform in Penang alone’.\(^{170}\)

In sum, the PDC entered the 1990s with essentially the same policy framework as previously. It continued to facilitate investment, provide targeted infrastructure, and supply

---

\(^{167}\) Interview with Lee Shok Mee, Head, Penang Educational Consultative Council, Penang (10/03/2004).

\(^{168}\) The Council works with private colleges to help them pool resources through initiatives such as establishing an electronic library or a collective repository of books. The Council and state government also work with the federal government and embassies to expedite visas for international students, and have organized a trade delegation of Penang-based colleges to tour nearby countries. The state government is also contemplating building hostels for students from outside Penang.

\(^{169}\) There were more than 20 colleges offering courses in business administration or IT, and a further ten who offered diplomas or degrees in engineering (SERI 2002a:xi). In 2001, more than 1,800 students were enrolled in engineering diploma courses. This compares to 1,000-1,200 enrolled in similar subjects in USM in 2000/2001. In addition, by having direct control over some tertiary education institutions, the Penang State Government is in a better position to offer tailored courses to investors, should the need arise.

\(^{170}\) Interview with Mark Chang.
skilled workers. However, lower levels of institutional capacity compromised service delivery in former areas of excellence, and the PDC was unsuccessful at generating a new vision for development. In particular, the PDC was unable to respond to new policy needs, particularly with regard to helping local firms upgrade. That said, there were areas of policy innovation, particularly in the education sector.

**Outcomes**

For the Penang-based electronics industry, the first part of the 1990s was characterized by a continuation of the growth experienced at the end of the 1980s. The basic combination of infrastructure and overseas marketing developed by the PDC in the 1970s proved sufficient to attract more investment from electronics MNCs. This was aided by external events in the late 1980s such as currency appreciation in other East Asian countries and changing tariff regimes. Therefore, Malaysia was the second most important recipient of FDI in the ASEAN region, receiving some US$ 22.5 billion during 1989-94. And, during the early 1990s, it was the most important site for Japanese overseas investment (Narayanan and Lai 2000:435, Ernst 2004: 114).

In addition, Penang benefited from agglomeration economies, as its existing base of supplier firms and trained workers attracted additional investments. Thus, Japanese firms like Sony, Toshiba, and Pensanko set up facilities to manufacture consumer electronics items (Rasiah 2002:105). Penang also became an important offshore centre for American disk drive and computer manufacturers as firms like Maxtor, Control Data, Seagate, Conner Peripherals, Applied Magnetics, and Dastek began operations in Penang in 1988-90. The disk drive sector expanded quickly, and by 1997 accounted for one third of employment in the sector (McKendrick et al. 2000:204-5).

The rise in other East Asian currencies made sourcing inputs from abroad relatively expensive for MNC affiliates, thus encouraging them to work more with local supporting firms (Narayanan and Rasiah 1992:86). As a result, the cluster of plastic, machine tool, and packaging firms catering to electronics MNCs grew to 155 in 1993 (Rasiah 2002:110).
These developments had a major impact on the electronics sector in Penang, which grew more than three-fold. The number of electronics firms jumped from 40 in 1988 to 91 in 1990, 129 in 1992, and 148 in 1996. Employment jumped from 29,000 to 62,000, 79,000, and 118,000 in the same years.

However, after 1996, the electronics industry changed considerably. As mentioned in Chapter Three, the sector’s technological requirements escalated dramatically. MNCs began to focus more on their core competencies, leaving sophisticated manufacturing and logistics tasks to their supplier firms. In addition, high-end firms have been established in nearby East Asian countries, and new low-end competitors such as China have emerged.

Diagram 5.3

Number of Firms in PDC Industrial Parks (1990-2002)

Source: DCT Annual Survey of Manufacturing Industries in PDC Industrial Areas, 2000-02

These changing requirements have exposed the structural shortcomings of Penang’s policy framework and base of supporting industries – as set out in Chapter Three. Thus, faced by locations with more sophisticated supplier firms and available skilled labour on one hand, and lower-cost locations for labour-intensive operations on the other, MNC investments have slowed. As Diagram 5.3 shows, the number of firms on PDC land expanded from 500 in 1990 to some 750 in 1996, before levelling off, dipping during 1998-2000, and rising slightly in 2001-02. Similarly, the number of electronics firms rose from 91 in 1990, to 150 by 1996, and remaining there until 2001, when it climbed to 164. As mentioned, while the
number of electronics firms is comparatively small, they employ a large quantity of workers and generate business for supplier firms.

Diagram 5.4

Employment in PDC Industrial Parks (1990-2002)

Source: DCT Annual Survey of Manufacturing Industries in PDC Industrial Areas, 2000-02

However, investment in facilities is less sensitive to market trends. Employment levels, in contrast, are more directly affected. Diagram 5.4 shows how the number of workers in the electronics sector rose up to 1995, before levelling off during 1995-2000, and then dipping in 2001 and 2002.

As mentioned in Chapter Three, a decline in employment levels is not necessarily bad, as it could signal a transition to higher value-added industries. However, while employment levels have fallen in labour-intensive industries, they have also been accompanied by falling job levels in skill-intensive industries, such as the hard disk drive industry, electronic component, and software sectors. Thus, as seen in Diagram 5.5, the composition of investment has also changed, away from new investments to re-investment in existing facilities.
Thus, Penang’s electronics sector is not fully equipped to face the heightened levels of competition that characterise the industry today. Its electronics sector was able to house large amounts of investment that required a lower-level trained workforce and basic infrastructure. However, while it has begun to host more value-added tasks such as design and marketing, it has been unable to move past a reliance on low-cost labour as the anchor of its competitive advantage. Thus, despite promising beginnings, the Penang State Government has not been wholly successful at fostering industrial-technological transformation.

**Summing Up**

During this period, the institutional components of Penang’s developmental state fell apart. The PDC, once a bastion of bureaucratic capacity and entrepreneurial policy-making, lost its autonomy and separate identity. The informal, yet useful, links with the local private sector were lost, and communication between the PDC and new local entrepreneurs all but ceased. Thus, even ‘developmental’ states erode and lose capacity, as their constituent institutions evolve – sometimes for the better and other times for the worse.
The PDC continued with its model of investment promotion, infrastructure, and skills provision. On one hand, these services were affected by the Corporation’s declining institutional capacity, and on the other, the PDC was unable to appreciate the need for new services. In particular, the lack of communication with local firms impeded attempts to create the supplier base of firms necessary for taking on more value-added tasks. In addition, the PDC was affected by its inability to work with key institutions, such as the local university, and to remedy national-level policy failures, particularly with regard to human resources.

Despite good growth in the early 1990s, Penang’s electronics sector stagnated and then began to shrink in the face of heightened technological requirements and the entry of other low-cost competitors. Despite some R&D, design, and marketing tasks, the electronics sector did not fully transcend its reliance on low-cost labour and in the new environment, its ‘created assets’ were no longer unique.

This downturn contrasts with Karnataka’s boom period, as the province’s software sector blossomed and came into its own after 1990. Unlike Penang’s electronics sector, the software sector was an almost entirely private-sector led affair. However, the Karnataka State Government also began to show considerable signs of responsiveness. While this was attributable to a ‘pocket of efficiency’ with remarkable similarities to the PDC, it was also due to the consolidation of a vocal and powerful section of the private sector and the heightening of competition between provinces for private sector investment as decentralisation and liberalisation policies enacted by the Central Government began to take effect.

Conclusions

This chapter has analysed how Penang’s sub-national state institutions have influenced the emergence and trajectory of its electronics sector. It has argued that the Penang State Government, in spite of its limited remit, was ‘developmental’ for a considerable period of time, successfully engineering the emergence and consolidation of a new industry.
From the early 1970s until 1990, the state government, through the Penang Development Corporation, had a highly efficient and effective pilot agency. The PDC had hand-picked and capable staff, high-level political backing, and unparalleled access to information from industry, government, and academia.

Thus, the PDC articulated a vision for the state’s development, and through extraordinary levels of entrepreneurship, was able to marshal funds to single-handedly engineer the emergence of the electronics sector in the state. In particular, the PDC, through close communication with the private sector, was able to overcome crucial information and coordination failures and implement a wide array of market-complementing policies. Furthermore, its proximity to local-level economic activity put it in a position to lobby the federal government for key policy changes to further aid the sector’s development. And, the PDC was careful to ensure that the fruits of growth were shared among the state’s different ethnic groups.

However, over time, the PDC’s institutional integrity came under threat. Changing political circumstances, lower levels of autonomy at the sub-national level, and decreasing bureaucratic capacity compromised the Corporation’s effectiveness, leading to its stagnation and increasing irrelevance.

Lower levels of bureaucratic capacity meant that traditional areas of excellence such as investment promotion and infrastructure provision began to decline. Self discovery initiatives changed focus, moving away from reducing information barriers for new activities towards more lucrative but less technologically-promising sectors.

Most crucially, the PDC lost its channels of communication with the local private sector. Whereas it once enjoyed unparalleled access to detailed information on policy needs and market failures, the PDC no longer reached out to local firms. Thus, the PDC continued with the industrial policy framework developed in the 1970s and was unable to appreciate the need for more continual, yet subtle interventions to help firms acquire and develop their technological capabilities. As a result, with no intermediate associations to represent them and little access to policy-makers, domestic firms were poorly placed to deal with the electronics sector’s heightening levels of competition.
Thus, this chapter has argued that while the Penang State Government successfully managed the birth of the electronics and nurtured its consolidation, it was unable to successfully foster industrial-technological transformation by helping local firms move up the electronics value chain away from labour-intensive tasks towards more capital-intensive ones.

Having looked at the electronics sector in Penang and the effect of national and sub-national institutions and policy frameworks on its development, the next chapters will turn to the software sector in Karnataka. As with Penang, the sector in question will first be analysed, before turning to national and sub-national institutional regimes and policy approaches.
CHAPTER 6
The Software Sector in Karnataka

Introduction

The previous three chapters looked at Penang’s electronics sector, seeking to explore how Malaysia’s, and then Penang’s, institutional context and policy framework shaped the sector’s progress towards industrial-technological transformation.

This chapter, for its part, is the first of three that will look at how national and sub-national institutions and policies shaped the development of Karnataka’s software sector and its potential for a similar sectoral transformation. As with the Penang section, this first chapter will discuss the nature and structure of the industry in question. The second chapter will look at national institutions and policy regimes, and the third chapter will do the same at the sub-national level.

Following this structure, this chapter will look at the software sector in India in general and Karnataka in particular. To this end, this chapter is divided into five sections. The first will discuss the software sector’s structure and value chain. The second will look at the software sector in India, analysing its evolution, capabilities, and position along the value chain. The third will apply the same framework to the software sector in Karnataka. The fourth section will assess the constraints and challenges facing India’s and Karnataka’s software sectors. The final section will put forth the chapter’s main conclusions and relate them briefly to the overall arguments that this thesis is making.

The Software Sector

This section will first provide necessary definitions and then lay out the sector’s value chain, before going on to discuss current market trends.
Definitions and Structure

Products in the information technology industry can be broken down into the hardware and software sectors. Hardware refers to ‘the mechanical, magnetic, electronic, and electrical devices which make up a computer’. Software, for its part, refers to ‘the instructions, programs, or suite of programs which are used to direct the operations of a computer, or other hardware’ (Heeks 1996:26).

Software is both a product and a process technology, and its market can be divided into products and services. The market for products is comprised of standardized software packages for general sale, which encompass: operating systems (which control a computer); tools (which are used to develop applications); and applications (which are designed for specific tasks like word-processing) (Mowery 1999:133).

Software services encompass an array of items. At the lower end, they entail the simple provision of personnel to a client firm to deal with sporadic demands for more manpower. They also entail maintaining outdated programs or managing migrations from one operating system to another. At a higher level, they include the customisation of complex software products to specific client needs, some of which require in-depth knowledge of a specific industry or ‘vertical’ such as retail, finance, or manufacturing. Higher-end services go beyond handling specific applications to encompass the development and implementation of overall IT strategies for firms (Arora & Arunachalam 2000:16).

While software engineering has incorporated concepts from industrial engineering to add structure to the development process, it is subjective – relying on personal experience and individual approaches to a given problem. Eischen states that

programmers do use rules of syntax and semantics, but like all languages these vary over time and space. There are no universal physical laws to define all software development...Software, invariably is a very human centred, almost artistic, process (2000b:29).
The Waterfall Model

The 'Waterfall Model' is an attempt to impose order and structure on software development (Diagram 6.1). It depicts the process as linear, beginning with problem analysis and program design in the upper left-hand corner, and flowing down to maintenance at the opposite corner.

Problem analysis is the first and most important stage as it involves determining the client's needs and the most appropriate programs for catering to them. While labour-intensive, this phase also requires knowledge of software development, the client's industry, organizational and personnel issues, and cost and time calculation skills. More often than not, this step requires proximity to the client in order to discern their needs.

The design stage consists of converting the client's requirements into procedures for software programming. Part of this process involves breaking down the job into discrete modules to make monitoring quality and progress easier. While much research has been carried out on software design, it remains a largely intuitive process acquired through experience on the job.

Coding involves transforming the procedures defined in the design stage into instructions that the computer can use. This stage is not very skill-intensive and, while it can be automated to some extent, the specifications required are so laborious and detailed that it is more common for it to be done manually (Parthasarathy 2004b:667).

Testing of each separate module as well as the entire software program must be continually carried out to ensure that the emerging product matches design specifications. No program is error-free and testing stops when: error detection falls below an established rate, it is no longer cost-effective, or the project deadline approaches.

While the Waterfall Model is the most widely used depiction of the software development process, in reality, the programming process is iterative and difficult to break into discrete stages. Programmers and developers do not possess complete knowledge about the program or customer requirements. Thus, project personnel must continually move between analysis, design, and coding, ensuring a continual 'design dialogue'.

This section draws on Heeks (1996:81-82) and Schware (1987:1251-54).
Delivery and installation are not particularly complicated procedures, and in many cases can be done virtually. Maintenance occurs after the software has been installed at the client site. Work involves correcting errors not detected during the development phase or modifying the program to satisfy additional or unmet requirements.

While the process is continuous, it can be seen that there is a difference between the problem analysis and design stages, and subsequent steps. The first two require more customer contact to specify requirements, as well as project management, personnel, and accounting skills. Thus, the sequence of steps is a value chain, with the more complex and skill-intensive steps occurring in the first part of the development process. Firms seek to
move up the ‘waterfall’, by moving away from simple coding and testing towards the better-rewarded problem analysis and design stages.³

However, unlike the electronics sector, in the software sector a firm’s position on the value chain is also affected by what it offers and what market it targets. In the electronics sector, a firm is more likely to belong to an inter-firm network where many of these strategic decisions are taken by a lead MNC. In contrast, in the software sector, many of these decisions are undertaken by the firm itself due to the lower barriers to entry and the more individual nature of service provision.

Therefore, the strategic choices facing software-producing firms can be depicted as a matrix (Diagram 6.2). Firms can choose to specialize in software packages or services and they can produce for the domestic or international market. Or, they can also choose to undertake a combination of these strategies.

Diagram 6.2 Strategic Positions for Software Enterprises

Software Business

<table>
<thead>
<tr>
<th>Services</th>
<th>Packages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Export</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>Market Served</td>
<td></td>
</tr>
<tr>
<td>Domestic</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>E</td>
<td></td>
</tr>
</tbody>
</table>

Source: Heeks 1999:2

¹ However, the last stages do require some domain knowledge. Thus, Parthasarathy argues that rather than classifying steps as skill or labour-intensive, it is more accurate to state that all steps are skill-intensive but to varying degrees (2004a:667).
The Software Package Market

Relative to service provision, software packages usually offer the highest returns. This is because, while the production process for packages and services is largely the same, there is a big difference in the ratio of fixed costs to revenue. Unlike in manufacturing, production costs are negligible and the bulk of labour and value-added occurs in the development stage. Because packages are sold on the mass market, the labour cost in relation to the number of products sold is very low. For example the ratio of worker to product for a moderately successful package is about 1:1000⁴, whereas for customized software it is 1:20-30 (Jones 1994:20).

However, breaking into the software package sector is capital-intensive and risky. Marketing budgets need to be big to establish a brand name and reputation. Furthermore, considerable investments need to be made to detect current and emerging user needs. Risk is also higher – as if a product does not sell well, it may not recoup the initial investment. Thus, lower-end software services (in coding and testing) require less initial investment. While there are some marketing considerations, low-risk tasks require little more than a personal contact in a target market. Higher-end services can be offered, once trust is established with a core client group.

The Software Services Market

While software services offer growth potential, firms that are able to break into this sector must also work their way up a particular hierarchy.

Onsite work entails providing staff to a client company for a temporary period to carry out specific tasks. The problem analysis and program design tasks are carried out by the client company, who also monitors progress and quality. Thus, the onsite staff performs only routine coding, testing, and maintenance work. This type of service is comparatively easy to break into, requiring contacts in the target market and a group of programmers. That said, it offers little value-added, requiring little knowledge about the client’s domain or
organization. Furthermore, there is minimal learning of new processes and procedures, meaning limited progress up the value chain (D’Costa 2003:217).

*Offsite work* usually encompasses more steps of the value chain. The contractor often undertakes problem analysis and program design. Under this set-up, the bulk of the work is not done at the client site, but the contractor’s premises. While a liaison team may be placed at the client site to maintain dialogue throughout the development process, the project management and deadlines are set and managed by the contractor. This type of work offers greater remuneration as more complex technical and managerial tasks are undertaken. However, a good deal of work still consists of routine tasks.  

**Local and International Markets**

Choosing between the domestic and international markets also represents a trade-off. While targeting the domestic market requires less capital and marketing expertise, it has several shortcomings. In many developing countries, domestic markets are small and do not support more complex or expensive products (Correa 1996:172). Similarly, due to the small size of the market, quality requirements are not high and firms are not exposed to best practice standards. Due to the limited size of the market and labour pool, it is also likely that personnel with specialized skills will be hard to obtain.

Those firms choosing to enter the international market directly face another set of obstacles. They may not have target market language capabilities. This is important for software, as customer support and accompanying documentation must be of good standard. They also face distance issues, as clients have to be at hand to establish trust and identify needs. Marketing costs are also high, particularly for new firms, as they have to overcome the reluctance of dealers to promote products or services from unknown firms. Last, it is also hard for firms to enforce their property rights overseas.

---

4 For very successful products the ratio can rise to 1:10,000 (Jones 1994:20).
5 Some clients agree to set up Offshore Development Centres (ODC) with the contractor. Under this arrangement, the contractor dedicates a team of workers on their premises to cater exclusively to the client. Because the relationship is more formalized, the tasks are usually more complex and offer more opportunities for learning. However, this arrangement does not prevent a contractor from running more than one ODC on their premises.
As a result of this structure, the software industry is composed of two groups of firms. The first group is comprised of very large firms, mostly from developed countries, that develop software packages. The second consists of many small firms, some of which are from developing countries, that offer software services and cater to industry ‘verticals’ in very specific areas (Correa 1996:176).

The Market Today

In 2003, the global market for software products and services was US$ 400 billion, and estimates contend that it will reach US$ 1.7 trillion by 2008. At present, global employment in the sector is estimated at some two million, with the potential to increase rapidly (Heeks and Nicholson 2004:267, Eischen 2000b:34).

The sector’s rapid growth is partly due to the dramatic expansion in the personal computer market and its derived demand for software packages and products. Furthermore, other sectors such as the telecommunications, automobile, power generation, and machine tool industries, whose products require ‘embedded’ software, are also important and growing sources of demand (Schware 1992:143).

Software is also being used in more and more areas of business operations, as technology enables more complex functions to be performed. Rather than being confined to simple processes, software products are increasingly being used in networks to structure, monitor, and verify business procedures (Baetjer 1998:30-31).

---

6 It is difficult to obtain good data on the software industry. This is because: software is intangible and can be traded across borders without being detected; countries can classify software as a service or a product; and a great deal of software development and maintenance is carried out in-house, leaving no records (OECD 2000:28). As such, most estimates refer to the traded software market, leaving out embedded software and untraded, or in-house, software development.

7 Due to measurement issues it is likely that the software market is significantly bigger than that. This is particularly the case with regard to the untraded market, which entails all software development carried out by in-house staff. Available estimates put the size of this market at double the traded and if personnel in this sector are included, then total employment ascends to some seven million for 1998 (Eischen 2000b:35).

8 For example, there are estimates that Hewlett-Packard (a computer hardware manufacturer) has 70 per cent of its R&D staff dedicated to software development, and Siemens (a semiconductor firm) dedicates 60 per cent of its R&D budget to the same end (Mowery 1996:4, UNCTAD 2002a:5).
The Cross-Border Delivery of Software Services and Products

However, while software is intangible and lends itself well to cross-border delivery, OECD markets still constitute the bulk of production and consumption. Unlike the electronics sector which began to internationalise in the 1960s, software development for export only began in the 1980s and international outsourcing became an accepted practice only in the 1990s. Three trends promise to consolidate this trend.

First, barriers to entry to the software sector are low and its geographic configuration of production is flexible. Large capital investments are not required to begin software development, as outlays are restricted to computers and telecommunications access (Correa 1996:172). Similarly, extensive networks of supplier firms, stocks of specialized parts and components, and sophisticated physical infrastructure are not needed. And, while skill-intensive, basic programming skills are generic and can be acquired by people with good knowledge of mathematics (Mowery 1999:163). Given these characteristics, it is likely that new low-cost service providers will continue to emerge.

Second, evolving MNC IT strategies are also contributing to the emergence of new software providers. MNCs are breaking down their IT needs into separate components and contracting service providers with niche specialization regardless of distance, increasing opportunities for small software developers in far-off locations (UNCTAD 2002a:12).

Third, widespread labour shortages are emerging in developed countries. High levels of demand coupled with the labour-intensive nature of most software work have given rise to a ‘software bottleneck’. Most types of software development have not proven amenable to automation, and increases in the size and complexity of software projects have been dealt

---

9 According to UNCTAD, several factors contributed to the national focus of software sectors. They were: the importance of government clients for procurement contracts (who tended to prefer domestic suppliers); traditionally protected hardware sectors that had their own operating systems; language issues; and domestic IPR regulations (2002a:11). Furthermore, issues related to proximity and transaction costs also have weighed heavily, with clients traditionally reluctant to outsource tasks or buy products from unknown suppliers.

10 This is because English is becoming more widespread, and the decline in protected hardware sectors accompanied with widely adopted systems and standards (such as Wintelism) means that nationally-based markets are losing their specificity. Furthermore, the increasing adoption of international software standards has made outsourcing software services more acceptable and reliable. This has also been aided by the strengthening of intellectual property rights legislation and compliance worldwide, which has made enterprises more comfortable about the cross-border delivery of services (UNCTAD 2002a:12).
with through hiring more workers rather than through gains in productivity (Eischen 2000b:32).  

Therefore, because of the sector’s strategic importance, rapid growth, and low entry barriers, many developing countries are seeking to foster local software production. According to UNCTAD, it is ‘one of the few opportunities open to developing countries for participating in a high-technology, knowledge-based industry’ (UNCTAD 2002a:32).

Thus, a small group of countries outside the traditional North American and Japanese markets are seeking to carve out niches for themselves in the software product and services segments. While, in absolute terms, they constitute small portions of the global market, they are growing quickly. India, Ireland, and Israel are regarded as the leaders of this group, with countries like the Philippines, China, and Russia following them (Heeks and Nicholson 2004:269).

**Summing Up**

This section has looked at the software sector’s structure and value chain. The software sector’s value chain is comprised of a hierarchy of tasks in the production process, but a firm’s success is also gauged by whether it offers packages or services and what markets it targets. Unlike the electronics sector, where firms form networks, the software sector is comprised of companies that work individually and form their own client base.

Furthermore, unlike electronics which is a mature sector, the software sector is dynamic and growing quickly. Its low capital requirements, employment generation possibilities, and revenue potential mean that a variety of countries outside the traditional market centres are seeking to foster domestic production.

11 Thus, by some estimates, there is a shortage of about one million software programmers in the US and about 500,000 in Western Europe (UNCTAD 2002a:5).
The Software Sector in India

Having set out the software sector’s structure, market segments, and current context, this section will look at the sector in India, exploring its structure, capabilities, and recent trends.

The Structure

Once known more for its over-regulated and autarkic economy, in recent times India has emerged as a leading destination for software services. The Indian software sector has grown consistently and quickly over the past decade and a half, with its revenue increasing from US$ 243 million in 1990 to US$ 15.6 billion in 2003-04 (Table 6.1). While the sector still represents a relatively small proportion of GDP, it has come to represent a vital source of foreign exchange. Over the same period, software exports increased from US$ 128 million to US$ 12.2 billion, coming to represent more than a fifth of the country’s exports. In addition to helping develop the country’s under-performing export sector, it has become a vital source of employment – directly employing some 810,000 professionals (Economic Times 03/07/2004).

A prime driver of the Indian software sector has been its ranks of skilled, low-cost professionals who work for a fraction of the wages of their OECD counterparts. While labour costs have been escalating rapidly, they are still attractive and the country offers savings of 30-50 per cent on labour for software firms, even after transaction costs are taken into account.

---

12 According to one interviewee, in 1998, labour costs in India were 10 per cent of those in the US. Interview with Krishnan Puthucode, CEO of Software Quality Centre, Bangalore (18/07/2004). This is consistent with existing cross-national comparisons, such as Kapur (2002:6).

13 Business managers operate on the one-third rule. When software development work is relocated to India, more than 50 per cent of the savings in wages are lost due to higher transaction costs. Thus, of the total amount, one-third is the new payroll, one-third transaction costs, and one-third profit. Presentation by S. Krishna, Professor, Indian Institute of Management, Bangalore & Dr. G. Venkatesh, Chief Strategist, Sasken, Conference on Cross-border Dynamics in India’s IT Sector, Bangalore (02/07/2004).
This equation, coupled with the 'software bottleneck', has resulted in the migration of many types of tasks to India. These tasks are either undertaken directly by MNCs through their offshore development centres, or indirectly through hiring an India-based firm to provide onsite or offshore services.

Table 6.1 Software Revenues and Exports (1990-2004)

<table>
<thead>
<tr>
<th>Year</th>
<th>Software Revenues</th>
<th>Software Exports</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>US$ millions</td>
<td>% of GDP</td>
</tr>
<tr>
<td>1990-91</td>
<td>243</td>
<td></td>
</tr>
<tr>
<td>1991-92</td>
<td>304</td>
<td></td>
</tr>
<tr>
<td>1992-93</td>
<td>388</td>
<td></td>
</tr>
<tr>
<td>1993-94</td>
<td>560</td>
<td></td>
</tr>
<tr>
<td>1994-95</td>
<td>787</td>
<td></td>
</tr>
<tr>
<td>1995-96</td>
<td>1253</td>
<td></td>
</tr>
<tr>
<td>1996-97</td>
<td>1859</td>
<td>0.59</td>
</tr>
<tr>
<td>1997-98</td>
<td>2936</td>
<td>0.72</td>
</tr>
<tr>
<td>1998-99</td>
<td>4011</td>
<td>0.97</td>
</tr>
<tr>
<td>1999-00</td>
<td>5539</td>
<td>1.24</td>
</tr>
<tr>
<td>2000-01</td>
<td>8298</td>
<td>1.81</td>
</tr>
<tr>
<td>2001-02</td>
<td>9958</td>
<td>2.07</td>
</tr>
<tr>
<td>2002-03</td>
<td>12314</td>
<td>2.38</td>
</tr>
<tr>
<td>2003-04</td>
<td>15574</td>
<td>2.64</td>
</tr>
</tbody>
</table>

Sources: Parthasarathy 2004b:666, NASSCOM website

As a result, the Indian software sector has traditionally been export-oriented, and this tendency has been accentuated over time. As Table 6.2 shows, exports have grown from around 60 per cent of total production in 1994-95 to almost 80 per cent in 2002-03. The Indian software sector has concentrated on specific markets – with the most important being North America and Western Europe, which received 63 per cent and 26 per cent of total exports in 2002 (NASSCOM website).

---

Table 6.2  Market Orientation and Export Revenues of the Software Sector (1990-2002)

<table>
<thead>
<tr>
<th>Orientation of Software Sector</th>
<th>Export Revenues</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Market</td>
</tr>
<tr>
<td></td>
<td>Domestic</td>
</tr>
<tr>
<td>1990</td>
<td>90.0</td>
</tr>
<tr>
<td>1993-94</td>
<td>62.0</td>
</tr>
<tr>
<td>1994-95</td>
<td>60.9</td>
</tr>
<tr>
<td>1995-96</td>
<td>60.3</td>
</tr>
<tr>
<td>1996-97</td>
<td>58.7</td>
</tr>
<tr>
<td>1997-98</td>
<td>59.0</td>
</tr>
<tr>
<td>1998-99</td>
<td>58.2</td>
</tr>
<tr>
<td>1999-00</td>
<td>57.3</td>
</tr>
<tr>
<td>2000-01</td>
<td>56.1</td>
</tr>
<tr>
<td>2002</td>
<td>46.6</td>
</tr>
</tbody>
</table>

Sources: Basant and Rani 2004:22, Parthasarathy 2004b:676

Regarding the breakdown of exports, products and packages constitute a comparatively small portion of total production – usually less than ten percent. Thus, the bulk of exports consists of software services. However, there has been a steady move away from onsite to offshore services, which, while not as sophisticated as the product market, still offer considerable room for undertaking more complex tasks. As a result, offshore services have increased from a mere 5 per cent in 1990 to more than half of the sector in 2002.

India has emerged as a market leader in specific segments, particularly the development of custom applications, where it has cornered almost a quarter of the world market. It is also rapidly gaining market share in the application outsourcing and R&D services segments (D’Costa 2004:11, NASSCOM website).

While considerably smaller than its export-oriented counterpart, the domestic market contains more sophisticated market segments. More than half of the sector’s revenues come from the sale of products and packages, with approximately a quarter coming from turnkey services.

---

16 However, several first-tier companies have successfully developed software packages for sectors such as banking, finance, and accounting. See Kumar (2001:4283).
projects, where contractors assume responsibility for all stages of a project. However, a large part of the product sales are not of domestically-produced items, but rather imports. That said, some local firms use the domestic market as a launching pad for international markets, and some of their products are very sophisticated (Arora et al 2000:9).  

The Firms

Estimates regarding the number of firms in the software sector vary, placing the total number of firms between 5,000-7,500, of which about 1,000 are active exporters (Heeks & Nicholson 2004:270). Looking at a breakdown of the sector by firm size, it can be seen that the most of the firms in the sector are small, with an annual turnover of less than US$ 2 million (Table 6.3).

Table 6.3 Breakdown of the Indian Software Sector by Annual Turnover (2000-01)

<table>
<thead>
<tr>
<th>Annual Turnover</th>
<th>Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above US$ 200 million</td>
<td>5</td>
</tr>
<tr>
<td>US$ 100-200 million</td>
<td>5</td>
</tr>
<tr>
<td>US$ 50-100 million</td>
<td>15</td>
</tr>
<tr>
<td>US$ 20-50 million</td>
<td>27</td>
</tr>
<tr>
<td>US$ 10-20 million</td>
<td>55</td>
</tr>
<tr>
<td>US$ 2-10 million</td>
<td>220</td>
</tr>
<tr>
<td>Below US$ 2 million</td>
<td>2483</td>
</tr>
</tbody>
</table>

Source: Basant and Rani 2004:23

The most visible firms in the sector are the largest five, whose turnover tops US$ 200 million per annum and who accounted for almost 30 per cent of total exports in 2000-01 (Kumar 2001:7). They include Tata Consultancy Services, Wipro, Infosys, Satyam, and HCL Technologies. These firms have a diversified portfolio of services and are largely focused on the US market. Over time, they have moved up from on-site services to take on

---

18 SMEs targeting the domestic market have developed capabilities in porting, website design, and technical consulting services. Bigger firms provide customized software development services, testing, and re-engineering. High profile projects include the Bombay Stock Exchange and the reservation system for the Indian railways (Arora et al. 2002:11).

19 According to the EIU, there are some 7,000-7,500 software firms in the sector (EIU 2005a:39). Quality Assurance of India, a leading software research company, estimates that there are 5,000. Interview with Deepak Kumar, Deputy Editor ‘Software Dioxide’ magazine, Bangalore (22/06/04).
more complex tasks such as IT consulting. These firms cater to Fortune 500 companies and are seeking to compete directly with developed country majors like Accenture and IBM. They have also proven rather successful at developing software products for specific verticals, such as banking, accounting, insurance, and securities (Sridharan 2004:35, D’Costa 2004:3). 20

The second and third tier firms are similar to the first, although they have a narrower product focus, and between them accounted for another 30 per cent of the sector’s exports in 2000-01 (Sridharan 2004:35). The remaining firms can be divided into those that subcontract work from larger domestic companies, and a smaller group of more dynamic, innovative firms who specialize in niche products, rather than professional services. 21 That said, many firms choose to offer a variety of products and services in order to diversify their revenue sources. 22

Regarding MNCs, they have begun to use India as an export platform to undertake specific tasks. Industry leaders like Texas Instruments, IBM, Hewlett-Packard, Microsoft have all set up facilities to develop software or carry out research and development. 23

The ownership structure of the sector is heterogenous, and reveals a number of interesting characteristics (Table 6.4). The first, rather obvious, point is that the sector is almost entirely in private hands, with public sector enterprises accounting for a minimal share of employment or revenue. The second is that the software sector is predominantly composed of local concerns, with MNCs, joint venture, and Non-Resident Indian firms amounting to only about a third of total revenue and employment. Indeed, as the next sector will show, MNCs began to locate to India only after the mid-1990s, when the country’s reputation was already established. In fact, some companies that are now MNCs were started by non-resident Indians or local entrepreneurs and were subsequently acquired by overseas

20 Although the big finns are more interested in establishing themselves as top-end service providers rather than making software packages. Interview with N. Dayasindhu, Research Officer, Infosys, Bangalore, (21/06/2004).
21 This is usually restricted to the provision of additional labour to deal with periods of peak demand, or very simple tasks like coding and testing. Interviews with: Krishnan Puthucode, Deepak Kumar, and Kavitha Reddy, Assistant Vice President, Team Lease, Bangalore (07/07/2004).
22 Presentation by Subroto Bagchi, CEO, Mindtree, Conference on Cross-Border Dynamics in India’s IT Sector, IIM-B, Bangalore (02/07/2004).
investors (Kumar 2001:4286). The third is that, while business house firms are important players, there is a large entrepreneurial element. The categories 'entrepreneurs' and 'professional entrepreneurs' account for 8 per cent and 28 per cent of the sector’s revenues respectively, indicating the sector’s newness.24

Table 6.4 Breakdown of the Indian Software Sector by Ownership (1999-2000)

<table>
<thead>
<tr>
<th>Type of Company</th>
<th>% of sales revenue</th>
<th>% of total employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business House Firms</td>
<td>32.8</td>
<td>30.1</td>
</tr>
<tr>
<td>Joint Ventures</td>
<td>4</td>
<td>4.2</td>
</tr>
<tr>
<td>MNCs</td>
<td>25.6</td>
<td>16.8</td>
</tr>
<tr>
<td>Public Sector Ent.</td>
<td>2.6</td>
<td>6.0</td>
</tr>
<tr>
<td>US-Indian</td>
<td>6.4</td>
<td>8.1</td>
</tr>
<tr>
<td>Entrepreneurial firms</td>
<td>8.1</td>
<td>10.6</td>
</tr>
<tr>
<td>Professional Entrepreneurs</td>
<td>27.9</td>
<td>27.2</td>
</tr>
<tr>
<td>Unknown</td>
<td>1.7</td>
<td>4.9</td>
</tr>
</tbody>
</table>

Source: Athreye 2003:33

Industry Trends

India made its debut as a low-cost location providing basic coding and testing services. Since then, the industry has gone through several phases of expansion and consolidation.

The Beginning

The software sector began in the mid-1970s with a small group of firms producing for export. Most of these firms were small and set up by professionals who worked for public sector enterprises or one of the few MNCs in India. They were initially simple operations - using personal connections to obtain contracts, which entailed sending staff to work on-site

---
21 Interview with Murali Patibandla, Professor of Corporate Strategy and Policy, IIM-B, Bangalore (09/07/2004).
24 The category 'entrepreneurs' refers to firms who were started by individuals from outside the IT sector, and 'professional entrepreneurs' refers to firms set up by individuals with experience in the IT sector (Athreye 2005:35).
on data entry and coding tasks (Parthasarathy 2000:344). By the end of the 1970s, the software sector was comprised of some 20 firms producing less US$ 5 million in exports (Pingle 2000:121).

During the 1980s, the industry grew steadily, as Indian firms began to make their reputations as reliable service providers, and the rise of networked computing opened new fields in the software sector. Thus, industry icons such as Wipro, Infosys, and Satyam established themselves and the first MNCs such as Texas Instruments and Hewlett-Packard set up offshore development centres (Athreye 2005:11). The number of software-producing firms expanded rapidly to about 700 by 1990, earning more than US$ 130 million in exports (Heeks 1996:73). However, the majority of work undertaken by both large and small firms was still largely low-end testing and coding (Evans 1995:195).

The Post-1991 Boom

After 1991, the industry began to expand even more quickly. The number of firms began to increase rapidly, due to heightened demand, but also because a generation of mid-level employees with experience in larger domestic companies set out to establish their own operations (Upadhya 2003:2). 25

Several important changes began to take place in the sector. While Indian firms were, by and large, unable to successfully make and market products, they began to move away from an exclusive reliance on on-site services. As Table 6.2 illustrates, offshore services came to represent a larger share of the total. This was an important development, as local firms found it easier to manage staff in one location – as opposed to various. In addition, more stable interaction between firm employees allowed more on-the-job learning and more targeted forms of expertise to be developed (Parthasarathy 2004c:17).

Furthermore, the larger and more successful firms began to climb up the value chain, undertaking more complex functions such as problem analysis and software design.

25 One estimate holds that 50 per cent of all firms in the software sector were set up during the 1990s (Arora et al. 2002:6)
Turnkey contracts, where contractors were responsible for all stages of a project, became more commonplace. The reputations of more established firms were bolstered by the widespread adoption of quality certification.

Multinationals also began to arrive, as India’s reputation as a stable, low-cost location grew. This was due to the presence of the first IT majors in India as well as lobbying by the many Indians working in these corporations (Patibandla & Petersen 2002:1571, Kapur 2002:12). Initially confined to low-end tasks, MNC back-end offices gradually began to take on more high-end and challenging tasks including design work and research and development (Parthasarathy 2000:351).

That said, even though more firms moved to the offshore provision of services in the latter part of the 1990s, much of this work was still low-end, such as preparing for the Year 2000 bug and Euro conversion. Even up to 1998, a full 65 per cent of all exports consisted of low-end tasks (Heeks 1998:7, Arora et al. 2001:1270). Thus, expansion was driven by expansive growth rather than increases in productivity. However, some big firms began to specialise in certain verticals such as finance, animation, and telecommunications (Athreye 2005:16).

The Dotcom Bust and Beyond

In 2000, the industry was affected by the dotcom bust and a recession in the US. While this only slowed, but did not stop, the sector’s growth, it led to a period of consolidation in the industry (Arora and Gambardella 2004:26). The market downturn caused leading Indian companies to change paradigm, away from simply providing basic services at a lower cost to complementing lower prices with more value-added services.

26 Interview with N. Muralidharan, Managing Director and Vice-President, Jobstreet, Bangalore, (07/06/2004).
27 ‘The emphasis was on numbers and hiring people. It was getting people on board first, and giving them skills over time.’ Interview with N. Muralidharan. ‘Before 2000, people did not have to market themselves – the issue was not about capability, but capacity’. Interview with Deepak Kumar.
28 ‘Now the question is – at this cost, what more can you bring?’ Presentation by Rajiv Mody, CEO, Sasken, Conference on Cross-Border Dynamics in India’s IT Sector.
Thus, the more established companies have sought to move up the ‘food chain’, focusing on ‘business critical’ market segments. They are also investing more in research to understand how evolving technologies are affecting the market. Firms are also seeking to compete in specific niches, be it clients of a particular size, verticals, or specific end markets. And, firms have begun to evaluate the value of a particular job based on its volume and relevance to their capabilities, seeking to focus on niche markets and establishing strategic partnerships. 29

Personnel requirements have evolved, moved away from hiring staff with a generalist IT background towards hiring people already possessing specific domain and product knowledge. Companies are also seeking to improve their management practices through recruiting staff with MBAs and degrees in finance. 30 Certification has also become ever more popular as a means of establishing credibility, and in 2004, 60 of the 80 CMM Level 5 companies in the world to be found in India (Heeks and Nicholson 2004:274). 31

Indian firms are also moving to different steps in the production process, away from simply coding, testing, and maintenance. There is more product development work being undertaken, in particular the design and conceptualisation phases. 32 In addition, Indian firms are also specializing in taking legacy applications and converting them into new products. 33

India is also becoming an important location for research and development, as more and more MNCs set up offshore development centres or outsourced projects to large firms. Over 1997-2002, more than 70 MNCs set up R&D facilities in India, bringing the total to 100 (Sridharan 2004:42). Furthermore, as the Indian market grows, corporations are also

29 Interview with Vignesh Ilavarasan, Postdoctoral Fellow, IIIT-B, Bangalore (29/07/2004).
30 Interview with Preethi Thomas, Consultant, Client Relations and Delivery, Ma Foi Management Consultants, Bangalore (17/07/2004).
31 The Capability Maturity Model was developed by the US-based Software Engineering Institute. It is a certification specific to the software market and lays out capability standards that firms must have for a given level of ‘maturity’. The classification goes from one to five, with five being the highest. For more details, consult Arora and Arunachalam (2000:46). ISO 9000 tends to be used for the European market, and CMM in the US and Australia. ‘Before these types of ratings were a luxury, now they are necessary for business.’ Interview with Krishnan Puthancode.
32 Interview with Preethi Thomas, Consultant, Ma Foi Management Consultants. Ma Foi specializes in Human Resources consulting and has 40 offices throughout India.
33 Interview with Anand Parthasarathy, Journalist, The Hindu, Bangalore (05/08/2004).
seeking to move research work there to be more aware of developments and tailor existing products to local needs.\textsuperscript{34}

India is becoming an important centre for embedded systems design, and in 2003, there were some 100 local firms in Bangalore alone (Parthasarathy and Aoyama 2006:12).\textsuperscript{35} Firms are also undertaking high-end semiconductor design work, and India beat Israel in hosting Intel’s biggest design facility outside the US (Economic Times 25/05/2005).

Thus, in 2002-03, India exported US$ 1.7 billion worth of R&D services. While a sizeable portion was undertaken by affiliates of corporations like Oracle, SAP, and Microsoft, domestic companies like Wipro and HCL were also significant players. They have successfully shown that outsourcing R&D to an Indian firm with domain expertise is feasible and cheaper than setting up an affiliate (Parthasarathy and Aoyama 2006:2, Athreye 2003:18, Businessworld 27/08/2001).

These developments are not just limited to large corporations, as there is a lot of dynamism among smaller companies. Some offer R&D services to large MNCs in very specific areas. Others specialize in niches such as digital signal processing, system-on-a-chip software, as well as embedded software.\textsuperscript{36} These firms are less oriented to service provision, but specialize more in product development. Interestingly, many of them were started in Silicon Valley by Indians, and have subsequently moved their front offices to India (Athreye 2003:27).

\textbf{Summing Up}

This section has examined the structure and performance of the Indian software sector. While the sector had its beginnings in the provision of relatively low-skill and labour-intensive onsite software services, it now earns more revenue from offshore services. The Indian software sector currently hosts more complex operations, as firms are providing

\textsuperscript{34} Presentation by Rajiv Mody, CEO, Sasken, and interview with Mary Mathew, Associate Professor, School of Management, Indian Institute of Science, Bangalore (19/07/2004).

\textsuperscript{35} Embedded systems are specific types of hardware that are produced with their own software placed on a read-only memory chip (Parthasarathy 2004:240)
niche services like software R&D, design and conceptualisation, and re-launching legacy applications. Furthermore, other firms are developing formidable expertise in specific product development areas such as embedded software and chip design. While the country has yet to emerge as a centre for product development or the highest end IT consulting services, its continual progress up the value chain and the absence of significant lower-cost competitors bode well for the future.

The Software Sector in Karnataka

This next section will look at Karnataka’s software sector. Using available research and complementing it with recent data from a range of primary sources, it will examine its structure, capabilities, and movement into new market segments.

While India as a whole has acquired a reputation in the software industry, the bulk of activity actually takes place in a limited number of locations. Two-thirds of the country’s software production takes place in five state capitals and, with the exception of New Delhi, is concentrated in the south and west of the country (Table 6.5).

Table 6.5  Software Exports and Firm Headquarters by Region (2000-01)

<table>
<thead>
<tr>
<th>Region</th>
<th>Exports (%)</th>
<th>Headquarters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangalore/Karnataka</td>
<td>26.64</td>
<td>160</td>
</tr>
<tr>
<td>New Delhi/Capital Territory</td>
<td>15.34</td>
<td>106</td>
</tr>
<tr>
<td>Chennai/Tamil Nadu</td>
<td>10.42</td>
<td>72</td>
</tr>
<tr>
<td>Hyderabad/Andhra Pradesh</td>
<td>7.02</td>
<td>61</td>
</tr>
<tr>
<td>Mumbai/Maharashtra</td>
<td>5.68</td>
<td>148</td>
</tr>
</tbody>
</table>

Source: Parthasarathy 2004b:673

36 Interview with Krishnan Puthucode.
37 Based on NASSCOM’s 700 largest members.
As can be seen, Karnataka has the largest share of software exports and firm headquarters, thus emerging as the most important centre of software production in India. The state's software sector has grown vertiginously from a mere 13 firms in 1991-92 to more than 1500 firms producing more than US$ 6.3 billion in exports in 2004-05 (Table 6.6).

The bulk of the country's exports is routed through the Central Government's Software Technology Parks, and the Bangalore branch is widely regarded as the most dynamic. From a small cluster employing a few professionals, the software sector now employs 160,000 people and its IT-enabled services counterpart 60,000 more (Economic Times 27/07/2004).

Table 6.6 Number of Firms and Software Exports Dispatched from Bangalore (1991-2005)

<table>
<thead>
<tr>
<th>Year</th>
<th>Firms</th>
<th>Exports (US$M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991-92</td>
<td>13</td>
<td>2</td>
</tr>
<tr>
<td>1992-93</td>
<td>29</td>
<td>7</td>
</tr>
<tr>
<td>1993-94</td>
<td>53</td>
<td>29</td>
</tr>
<tr>
<td>1994-95</td>
<td>79</td>
<td>57</td>
</tr>
<tr>
<td>1995-96</td>
<td>125</td>
<td>134</td>
</tr>
<tr>
<td>1996-97</td>
<td>163</td>
<td>249</td>
</tr>
<tr>
<td>1997-98</td>
<td>207</td>
<td>400</td>
</tr>
<tr>
<td>1998-99</td>
<td>267</td>
<td>736</td>
</tr>
<tr>
<td>1999-00</td>
<td>782</td>
<td>941</td>
</tr>
<tr>
<td>2000-01</td>
<td>928</td>
<td>1551</td>
</tr>
<tr>
<td>2001-02</td>
<td>1038</td>
<td>2070</td>
</tr>
<tr>
<td>2002-03</td>
<td>1154</td>
<td>2648</td>
</tr>
<tr>
<td>2003-04</td>
<td>1322</td>
<td>4000</td>
</tr>
<tr>
<td>2004-05</td>
<td>1520</td>
<td>6270</td>
</tr>
</tbody>
</table>

Source: Karnataka State Department for IT (KSDIT)

38 Interview with R. Remali, Executive Officer, Software Technology Parks of India, Bangalore (23/07/2004).
39 http://www.bangaloreit.in, accessed 10/11/2005. This is based on companies who register with the Software Technology Park. The number of Bangalore-based firms is most likely larger, although firms that are not registered with the STPI would not be significant exporters. Between 94-96 per cent of exports from Bangalore are routed through STPIs (Pillai and Raman 2002:706).
The city is home to most of the IT majors, and eight of the top ten firms present in India have their headquarters in the city (Lema 2005:6). Bangalore is also the site of choice for foreign investments, receiving the greater part of the country’s FDI. Fifty percent of investment from the United States goes exclusively to Bangalore (Economic Times 23/04/2005). According to Walden International, 35 per cent of the more than US$ 1 billion in risk capital invested in India in 1998-2000 was invested in Bangalore (Businessworld 26/02/2001).

It is estimated that three new IT or IT-enabled service firms set up in the city every week and six MNCs set up affiliates every month (The Economist 23/04/2005, Cyber India Online 05/01/2004). More than 230 MNCs have facilities in the city, with more than 100 dedicated R&D centres that have produced international patents (Sridharan 2004:42, Deccan Herald 30/09/2003). Furthermore, while international investors initially restricted their projects to specific product components, recently industry majors have been conceptualizing and designing entire products in Bangalore (Economic Times 31/08/2004).

**Recent MNC Investments**

Regarding major software firms, some of the more notable developments in Bangalore are the following:

- SAP has established its research and development base for the Asia-Pacific region with more than 1,000 software developers (Economic Times 15/10/2001).
- Yahoo set up its first software development centre outside the US (Indiainfo 14/07/2003).
- Google established its first R&D centre, which will conceptualise and develop complete software products, including all phases of the product development cycle (Financial Express 14/10/2004).
- Microsoft inaugurated a research lab, only the company’s third outside the US (Economic Times 01/12/2004).
Cisco Systems invested US$ 200 million in an R&D facility that employs 1,500 engineers and has filed 50 patents (Businessworld 26/02/2001, The Hindu 1/11/2003).

Given the city's development of expertise in embedded systems, and particularly integrated circuit design, hardware-producing MNCs are also coming to Bangalore.

- Texas Instruments has expanded its R&D facility to be the largest outside the US, employing 1,500 engineers. It is the company's center of excellence for chip design and has filed more than 170 patents (Patibandla and Petersen 2002:1567, Businessworld 18/03/2002).

- IBM has invested more than US$ 100 million in a software development lab. It is the company's largest research centre outside the US and employs 3,100 engineers that have filed more than 85 patents. The company predicts that it will eventually employ 10,000 engineers (Businessworld 26/02/2001, Dataquest 31/08/2002).

- Bangalore has beaten Tel Aviv to become Intel's largest design centre outside the US. The R&D facility has doubled its staff to 3,000 engineers, specializing in software design, e-business software development, and circuit design (The Economist 01/04/2003, Economic Times 30/07/2004).

- Motorola's Bangalore-based R&D centre has overtaken other facilities in the region (including Penang) to now design ten percent of all the MNC's products - which represent US$ 2-3 billion in revenue (IndiaInfo 13/07/2005).

- Other hardware producing-companies setting up R&D facilities include LG, AMD, Philips, Siemens, Nokia and General Electric. Global auto MNCs such as DaimlerChrysler and General Motors have also established such facilities (Economic Times 05/03/2004, 22/04/2004, 19/10/2005, Dataquest 31/08/2002, Business Line 03/09/2003).^40

---

^40 Interview with Dr. Roland Haas, Managing Director, DaimlerChrysler, Bangalore (03/08/2004).
Local Capabilities

With regard to local companies, a significant portion of Bangalore’s production is still on the lower-skill end of the spectrum. However, it has come a long way from a sole reliance on onsite service provision. Service companies, while still important, are no longer in the majority. Firms in Bangalore also specialize in more complex tasks like communication, systems, and application software (Table 6.7).

Table 6.7 Firm Specializations in Bangalore (2002)

<table>
<thead>
<tr>
<th>Specialization</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated Circuit Design</td>
<td>46</td>
</tr>
<tr>
<td>Communication Software</td>
<td>108</td>
</tr>
<tr>
<td>Systems Software</td>
<td>166</td>
</tr>
<tr>
<td>Application Software</td>
<td>293</td>
</tr>
<tr>
<td>Service Companies</td>
<td>303</td>
</tr>
</tbody>
</table>

Source: KSDIT

The city is becoming a centre in India for product development work, particularly the design phase, and embedded systems. According to Parthasarathy and Aoyama, ‘Bangalore is not just the leading center for India’s software exports, but is also increasingly specialized in embedded systems design and value-added R&D services’ (2006:2). Integrated circuit design is also very high-end, and more recent data puts the number of Bangalore-based firms in this niche at 100.

According to Ma Foi Management Consultants

in terms of regional differentiation – Bangalore and Mumbai are centers for financial companies, Delhi, Bangalore, and Hyderabad for embedded systems,

---

41 http://www.bangaloreit.in, accessed 10/11/2005. These categories are somewhat arbitrary, as most companies engage in a variety of activities. Revenues from services are more steady and often used to cross-subsidize forays into the product market. Presentation by Subroto Bagchi, CEO, Mindtree, and interview with Chief Operating Officer, Firm C, Bangalore (11/06/2004).

42 Interviews with Preethi Thomas and Anand Parthasarathy.
Hyderabad for enterprise resource planning, and Pune for mainframe issues – but Bangalore has everything.\textsuperscript{43}

In particular, Bangalore appears to stand out for its R&D base, generating more products and new services.\textsuperscript{44} While it is facing increasing competition from neighbouring states like Andra Pradesh, to date, they lack the talent pool and stock of companies to rival Bangalore (FEER 22/08/2002). According to an industry observer:

\begin{quote}
In India, you have the relocation of high-end R&D operations as well as low-end. In Bangalore, you get the highest end, as most investors realize that you have the capacity here to outsource these tasks. In other locations like Hyderabad, you have generic and low-end work outsourced.\textsuperscript{45}
\end{quote}

India’s different software production centres could be developing a geographical division of labour, with certain states specialising in different tasks along the value chain. Available evidence suggests that Bangalore is at the top end. Walden International carried out a survey of start-ups across India, and found that Mumbai-based firms tended to specialise in IT-enabled services, as well as content development, graphics, and animation. Delhi, and Hyderabad also specialized in IT-enabled services. Chennai-based firms targeted a wide variety of niches. Bangalore firms, for their part, tended to specialise in technology development (Businessworld 26/02/2001).

Thus, Karnataka’s capital, Bangalore, has emerged as the country’s leading centre for software products and services. More local and international firms have located their headquarters and R&D centres in the city to tap its location-specific attributes. Thus, Karnataka is moving away from basic onsite service provision to more complex offshore services, including R&D and design. In addition, most of the country’s high-end product developers are based in Bangalore. Therefore, Karnataka’s software sector is progressing further up the software value chain than other competing centres in the country and beginning to delegate more labour-intensive tasks elsewhere.

\textsuperscript{43} Interview with Preethi Thomas.  
\textsuperscript{44} Interviews with Murali Patibandla and Rupa Chanda, Professor, IIM-B, Bangalore (04/04/2004).  
\textsuperscript{45} Interview with Murali Patibandla.
Challenges and Constraints

Unlike Malaysia and Penang, whose industrial development model is in question, India and Karnataka are still growing quickly on the basis of plentiful, low-cost skilled labour. Furthermore, as the paragraphs above have argued, Karnataka is making important progress towards complementing existing low-cost functions with more unique capabilities. However, arguments to the effect that the India’s and Karnataka’s software sectors are moving toward maturity are rather over-stated, as they face a series of important challenges.

Low Market Share

In the first instance, while growing quickly, the Indian software sector is still a relatively small player in the international market. In 2002, its total production was a mere two percent of total global production (Business India 28/04/2003). While the country has managed to corner almost a quarter of the custom applications segment, its share of other market sectors is very small. Even India’s share of the professional services segment, of which customs applications is a part, is less than four percent of the global total. The country’s share of the product and outsourcing sectors is even smaller (Table 6.8). However, while India is a small player, its hitherto unbeatable cost advantage and the vast market share yet to be conquered augur well for future growth rates.

Table 6.8

<table>
<thead>
<tr>
<th>Market Segment</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional Services</td>
<td>3.7</td>
</tr>
<tr>
<td>IT Consulting</td>
<td>0.3</td>
</tr>
<tr>
<td>Systems Integration</td>
<td>0.1</td>
</tr>
<tr>
<td>Custom Applications</td>
<td>23.1</td>
</tr>
<tr>
<td>Network Consulting and int.</td>
<td>3.3</td>
</tr>
<tr>
<td>Product Services</td>
<td>0.3</td>
</tr>
<tr>
<td>Outsourcing services</td>
<td>neg.</td>
</tr>
</tbody>
</table>

Source: Sridharan 2004:11
Indian firms are overwhelmingly reliant on one market. Even though the US is the world's largest software market, its share of more than 60 per cent of India's total exports represents a high degree of dependence and vulnerability to market trends. Thus, Indian firms need to branch out, in particular targeting non-English speaking markets in Europe such as Germany and France, as well as countries like Japan (NASSCOM 1999:2.11). Thus, India's low-cost advantage here will need to be supplemented with new language skills if this is to be achieved.

Crucially, India's domestic market is under-developed. There are a variety of reasons for this, including: low government and private sector expenditure on IT, limited PC ownership and usage, and high levels of piracy (Kapur 2002:17, Economic Times 03/07/2004). This can constitute a significant barrier for the software sector's long-term dynamism, as proximity to sophisticated end-users is necessary for firms to develop innovative products and packages, which can then be exported. At present, Indian firms are too far from European and North American markets to successfully develop commercially-successful software packages (D’Costa 2004:9).

**Lack of Innovation**

Partly because of distance, the Indian software industry has had very limited success at breaking into the software package market segment. While on-site services are less important than they used to be, offshore services are also reliant on many low-skill tasks. As a result, sales per worker in India are significantly lower than in Israel or Ireland. In 2000-02, the figures for these countries were US$ 30,000, US$ 120,000, and US$ 270,000 respectively (Arora and Gambardella 2004:41).

The sector's limited capacity for innovation is compounded by a lack of differentiation between firms and the consequent gains in efficiency that arise due to specialisation. Subcontracting between Indian firms is exclusively limited to staff provision for periods of
excess capacity, rather than undertaking tasks requiring domain expertise. In this respect, Karnataka’s cluster of firms is no different from those in other parts of the country.

There are some structural reasons for this, as many MNCs are reluctant to outsource more technologically-intensive tasks for fears of intellectual property theft. In addition, confidentiality clauses prevent contracting firms from sharing jobs between themselves (Vijayabaskar & Krishnaswamy 2004:186, Parthasarathy 2004c:23).

However, Indian software companies are notoriously loath to invest in R&D themselves. Only a few firms have chosen to invest in developing proprietary technologies (Arora et al 2002:6). In general, profits are used to expand firm size or buy out competitors. Furthermore, when companies do invest in research, it is to understand new markets or to gauge the impact of technology that others are developing. This complacency could be the result of the sector’s continued growth over the last 15 years. Thus, according to a Research Officer at a leading Indian software firm ‘the industry is not in a position to feel that research is bottom-line, but rather that it is nice to have it. You can still grow healthily without it.’

**Little Specialization**

Furthermore, while firms maintain that domain expertise is a key differentiator between competitors, the reality is that most of the tasks undertaken by outsourcing firms such as coding and testing are similar. The sector’s low barriers to entry, coupled with weak differentiation, means that companies are reluctant to contract out significant aspects of a project – for fear of losing clients (Lema 2005:12).

Thus, to date, the bulk of commercial ties and inter-personal networks are international, rather than local. Entrepreneurs invest time and effort to establish ties with international

---

46 'There is subcontracting, but no-one wants to acknowledge it. You have large MNCs who subcontract to large domestic players, who, in turn, subcontract to small players. Also a lot is simply getting extra bodies...rather than specific services.' Interview with Deepak Kumar.
47 Interviews with Mary Mathew and Murali Patibandla.
48 Interview with N. Dayasindhu.
49 'The software industry does not function as an ecosystem or cluster, with tiered competition. When people leave a company, they take part of the customer base with them.' Interview with N. Dayasindhu.
clients or front-offices in target markets, as this is the most effective way to procure business. Facilities for networking and meeting new clients are under-developed, and strictly personalistic – even in Bangalore, which is famed for its modern business culture (Upadhya 2003:1).

As a result, while the biggest Indian IT firms are still small by world standards, they account for a disproportionate share of the industry’s profits and exports. In 2000-01, the top 25 Indian IT firms accounted for 65 per cent of the industry’s exports. Furthermore, because of the lack of differentiation between firms, software majors often take over smaller competitors. According to one small firm-owner

> There is a large player bias in the industry. There is no real forum to showcase SMEs, and it is difficult to deal with Indian majors. They are not ready to build a value chain as they want it all. There is no eco-system, thus it is difficult to get opportunities.

**Skill Shortages**

In addition, all firms in the sector are affected by skill shortages. In the first place, the supply of engineers and software specialists is uneven. While there are very good leading universities and technical colleges, the quality of the remaining tiers of the education system is uneven. Thus, competition for high-calibre recruits is fierce. The education system is also geared to producing under-graduates, as opposed to engineers and technicians with the specialised expertise that the sector needs. In addition, most recent graduates require three to six-month in-house training programs before being able to work.

---

50 Client MNCs can also introduce subcontracting firms to other clients. Interview with Chief Operating Officer, Company C, Bangalore (11/06/2004).
51 'In the IT sector, you don’t have match-making agencies... jobs are won through personal contacts every time'. Interview with Rajendra Bandi, Associate Professor, Centre for Software and IT Management, IIM-B, Bangalore (13/07/2004).
52 In 2000, the average size of the ten largest Indian IT firms was US$ 278 million compared to US$ 5.9 billion for the top ten global IT firms (Sridharan 2004:35).
53 Interview with General Manager, Marketing, Firm D, Bangalore (14/06/2004).
54 Presentation by a small firm owner, Software Process Improvement Network Conference on Moving Up the Value Chain, Bangalore (25/06/004).
Thus, the skill mix of Indian software professionals is ‘programmer-heavy’, with a crucial shortage in middle management and senior technical positions – in particular to be able to plan larger projects and greater numbers of personnel. This calibre of personnel is crucial for the move away from on-site jobs to more complex turn-key projects. While emigration rates have started falling since 2000, this layer of expertise has thinned due to the sustained migration of software professionals to OECD countries.

According to an industry observer:

at the very high-end range of tasks, there is scarcity of labour in India. The education system is not producing enough people in pure sciences, engineering and mathematics – MBAs attract more people. If this is not rectified then design and engineering won’t come.

This situation, coupled with the sector’s sustained expansion, has resulted in spiralling wage rates and high levels of attrition. Domestic firms and, in particular, SMEs are disproportionately affected by this. In Bangalore, wage rates are currently 17 percent above those in other states, and the IT sector there is facing key personnel shortages. One estimate holds that the city needs 8-10,000 testers alone (Business Line 18/02/2005, Deccan Herald 02/08/2004).

Summing Up

This section has reviewed the challenges and constraints facing Karnataka’s and India’s software sectors. In general, India has yet to transcend its reliance on labour-intensive software service provision. There is little differentiation between firms, relatively little innovation or acquisition of unique capabilities, and skill shortages are emerging. In spite of Karnataka’s higher position on the value chain, it, too, suffers from these problems. However, while neither sector has attained industrial-technological transformation to emerge as a leading-edge service provider or product developer, their continual progress up

56 Interview with Murali Patibandla.
the value chain, the vast market segments open to them, and the lack of credible low-cost competitors bode well for the future.

Conclusions

In spite of India’s traditionally modest rate of growth and comparatively under-developed domestic demand for software, the country has emerged as a dynamic production centre for the global market. The sector has expanded quickly and consistently over the last 15 years, and is now a major international player, particularly in the professional services sector. The country’s vast stocks of skilled and low-cost labour have meant that re-locating at least some software functions to India is now mandatory for many multinationals.

While India does not have particularly dynamic product development capabilities, the industry has, over time, moved away from an exclusive reliance on on-site work to a more mixed array of services, including offshore work and some product development. The move away from labour arbitrage was accelerated after the 2000 market downturn as, since then, Indian firms, and particularly the largest ones, have made a concerted effort to establish clear and identifiable types of expertise. While the sector has not achieved industrial-technological transformation, its progress towards this goal has been steady.

The Indian software industry is not clustered in one location, but rather has various clusters, largely in the south and west. Thus, in addition to New Delhi - Maharashtra, Andra Pradesh, and Tamil Nadu house important centres. However, in spite of the other sites of software production, Karnataka stands out as a centre of creativity and dynamism, with a deeper talent pool, a greater number of R&D centres, and more specialized capabilities in areas like embedded software and integrated circuit design.

The capital city, Bangalore, produces more exports than any other city in India, and is the site of choice for international investors. There is an incipient inter-regional division of labour, as more capital and skill-intensive tasks gravitate towards Bangalore, and other, lower-end tasks are delegated to other states. However, like the Indian software sector, it has yet to transcend its reliance on lower-end service provision. There is relatively little
differentiation between firms, the bulk of which seek to compete on price. Dynamic leading-edge firms are still the exception to the rule. That said, Karnataka’s potential for industrial-technological transformation exists and the state is likely to the country’s leader in the shift towards more unique and value-added services and products.

This chapter has looked at the software sector in India in general and Karnataka in particular, paying attention to its structure, capabilities, and market opportunities. The following two chapters will look at how national and sub-national institutions and policies influenced the sector’s trajectory. Chapter Seven will look at how the Indian state and its policy framework contributed to the country’s middling economic performance on one hand, and its dynamic software sector on the other. Chapter Eight, for its part, will extend this framework downwards, paying particular attention to how the Karnataka State Government through its capabilities, political priorities, and relations with the private sector influenced the development of its software sector.
CHAPTER 7

The Indian State and Industrial Policy Framework

Introduction

The preceding chapter looked at the state of the software sector in Karnataka, setting out its strengths and weaknesses, as well as its level of development relative to other locations in India. It argued that software in general, and Karnataka in particular, stand out as centres of dynamism in the Indian economy. While Karnataka’s software sector suffers from certain diseconomies of scale, the talent pool, quantity of companies, and number of R&D centres it hosts is unmatched. Notwithstanding this, Karnataka has not yet attained sectoral transformation and faces increasing competition from other production centres. Unlike Penang, however, Karnataka appears capable of moving further up the software sector’s value chain.

The next chapter will focus specifically on the role of the Karnataka State Government in shaping the trajectory of its software sector. This chapter, for its part, will seek to understand the national context within which Karnataka’s institutions and policies are located. Thus, following the approach used in Chapter Four, this chapter will bring together a wide range of secondary material to: evaluate the national state’s capacities for fostering economic transformation; gauge the effectiveness of economic and industrial policies; and set out the context within which India’s sub-national governments operate.

To this end, this chapter will be divided into six parts. After a brief discussion of India’s colonial experience, the subsequent four sections will provide an analysis of an era in India’s recent history. As before, each section will adopt a Historical-Institutional approach in exploring the respective period’s political and institutional context before analysing the policy context and outcomes. The sixth and final section will advance the chapter’s conclusions and central argument.
Colonial India

As with Malaysia, British interest in India was initially commercial in nature, concerned with securing access to spices, cotton, and taxation revenue. This was achieved under the aegis of the British East India Company which, during the second half of the 18th Century, encroached on the dying Mughal Empire’s territories (Kulke and Rothermund 1998:222-3).

By 1800, the British had secured control of the coasts and the agriculturally productive plains of the interior. By 1850, the Company directly controlled about 60% of the national territory and indirectly controlled the remainder – which consisted of some 560 Princely States governed by traditional rulers. In 1858, following the Sepoy Rebellion across northern India, the British East India Company was dissolved and sovereignty of its territories ceded to the Crown (Hardgrave and Kochanek 1986:28, Corbridge and Harriss 2000:5).

The British colonial administration initially tried to impose central control and a unified set of governing institutions across India. However, this was complicated by the country’s size, multiple linguistic and religious communities, and differing pre-existing structures of governance. Thus, as in Malaysia, Britain came to directly administer the territories it had conquered, and exercised indirect control over the Princely States (Wolpert 1997:240).

British presence was accompanied, and underlain, by the transplant of many institutions. The colonial government was manned by the Indian Civil Service, which was initially staffed by British officials but gradually incorporated greater numbers of Indians. The Service’s selective recruitment, good employment conditions, and frequent rotations entailed a bureaucracy of good calibre and relatively low levels of rent-seeking (Potter 1996:258). The administration also installed a well-developed legal structure, a professional army, and - in response to increasing nationalist unrest - limited democratic practices (Chatterjee 1997:6-7, Tomlinson 1993:152).¹

¹ In addition, English replaced Persian (from the Mughal Empire) as the language of government and education, becoming the de facto lingua franca across the territory (King 1997:13).
As in Malaysia, the colonial state was essentially ‘laissez faire’, as its functions encompassed collecting taxes, ensuring property rights, and keeping order. As it was geared to ‘extraction and general management’, it expropriated savings and paid scant attention to industrialization – the exception being the railway network (Kohli 2004b:248-50, Wolpert 1997:229).

After 1850, a local capitalist class developed independently of the colonial administration. Many businesses began producing textiles, paper, cement and a range of commodities for the domestic market and, over time, moved into more demanding sectors like steel and shipping. At independence, this group controlled more than 70 per cent of the local market, accounted for 80 per cent of jobs in large-scale industry, and was well-poised to capture market sectors that the British were vacating (Chandra et al. 1989:376, Tomlinson 1993:143).

India’s colonial experience also shaped its independence movement. The Indian National Congress (INC), India’s premier nationalist organization, was founded in 1885. Congress was initially comprised of urban middle class professionals seeking to improve their access to positions in the colonial administration. Over time, this group came to promote independence from Britain (Corbridge and Harriss 2000:14, Hardgrave and Kochanek 1989:43).

The Second World War, growing opposition in India, and local political developments in Britain laid the groundwork for the country’s independence. The INC’s uncontested popularity and its prominent role in the independence movement meant that one of its leaders, Jawaharlal Nehru, became Prime Minister of the transition government in 1946 (Hardgrave and Kochanek 1989:50).

The Emerging State (1947-1964)

During India’s first 20 years of independence, the state had very high levels of legitimacy, an enlightened leadership, and high levels of bureaucratic capacity. In spite of the country’s size and diversity, power was centralized, there was widespread consensus regarding the
need for rapid industrialization, and the state enjoyed the private sector’s ostensible agreement for intervention in the economy. These would appear to be ideal circumstances for the emergence and consolidation of a developmental state.

The Political Context

Congress in the Post-Independence Era

The Indian National Congress was Asia’s oldest political party, enjoyed a long period of enlightened leadership under Nehru, and had unquestioned legitimacy as the country’s premier independence movement. In addition, the INC had a very clear ideological platform consisting of democracy, socialism, and secularism, and a well-articulated economic strategy (Clark and Roy 1997:96,106).

However, in spite of its popularity and legitimacy, Congress faced serious political constraints, as it was actually an ‘amorphous’ and ‘weakly disciplined organization’. Kohli (1989) argues that the reasons for this lie in the party’s genesis as a nationalist movement, whose goal was to garner broad-based support for independence above other political considerations. Thus, while the platform of democracy, socialism, and secularism appealed to and was promoted by its middle-class leadership, Congress had to negotiate with other powerful stakeholders to remain viable (1989:59).

As a result, while the INC enjoyed unrivalled levels of legitimacy at independence, it possessed low levels of internal discipline and had an uncertain mandate to pursue its economic strategy.

---

India’s class structure was, in the run-up to independence, comparatively cohesive, thus eliminating the possibility of a class-based political strategy to gain support. Rather, an inclusive political strategy aimed at gradual change offered more promise. To this end, Congress courted a wide cross-section of society, with a platform based on class conciliation rather than class conflict. This strategy was well-suited to gaining support for independence and also contributed to the country’s political integration. However, it also meant that Congress became less defined and able to ensure ‘organizational loyalty or discipline’.
The ‘Dominant Proprietary Classes’ and the State

Furthermore, the INC did not assume power in a vacuum - rather it had to confront a variety of powerful and entrenched interest groups.

Bardhan argues that the Indian state has had its economic policy shaped and constrained by the country’s ‘dominant proprietary classes’. He contends that the ‘ruling coalition’ was comprised of large industrialists, rich farmers, and the bureaucracy, which together comprised about 20 per cent of the country’s population. None of these classes was powerful enough to capture the state alone, and was offset by the existence of the other two.

Each class had an interest in maintaining a ‘tacit alliance’ to extract concessions from the state in return for maintaining the ‘democratic process’ which legitimated the benefits they were receiving. Industrialists received bail-outs and protection from international competition, rich farmers received subsidized inputs and credit facilities, and the bureaucrats gained power and revenue through an increasingly complex patronage system. Over time, the channelling of state resources into such a wide range of unproductive activities undermined economic performance (1988:218).

However, it would appear that Bardhan’s argument is somewhat over-extended. While these groups or ‘classes’ certainly had power, it appears limited. Despite a powerful elite agricultural lobby, Congress leadership remained committed to developing industry over agriculture (Rothermund 1993:132). Similarly, the state privileged the expansion of state activity in the economy at the expense of the private sector (Chibber 2003:170-75). And, civil service wages and working conditions declined considerably after Independence (Pedersen 1992:624,627). Thus, the power of these groups appears to be limited to blocking or subverting policies prejudicial to their interests, rather than actively shaping them.

3 Bardhan subsequently nuanced this, stating ‘Outside these dominant proprietary classes there are also sections of unionised industrial workers, traders, and small propertied groups that are quite vocal in lobbying for their separate economic interests’ (1988:215). However, he contends that they are not powerful enough to be included in the dominant proprietary coalition.
Therefore, the more important point that Bardhan makes is that there were powerful interests that the newly-developing state had to negotiate with. This political struggle over the establishment, maintenance, and modification of institutions thus shaped the emerging state and its policies. In addition, these powerful interests were to pose competing claims on state resources.

A 'Fragmented-Multiclass' State?

The effects of these interest groups on overall state policies and economic performance has been encapsulated in Kohli’s work on the ‘fragmented-multiclass state’ (2004a and 2004b). Rather than the state prioritizing economic growth and allying with a narrow group of business elites, Kohli argues that the Indian state, particularly in the early era, attempted to pursue various goals simultaneously and allied itself with a variety of interest groups. In addition to economic growth, the redistribution of wealth, national sovereignty, and political legitimacy were all goals at one time or another.

The pursuit of a wide variety of objectives had three effects. First, this allowed particular groups to ‘capture state resources for short-term consumption-oriented benefits’. Second, it meant that the relationship between the state and the business class was more variable, and less oriented to long-term trust and cooperation. Third, the formulation of policies and their implementation was less focused on, and oriented to, promoting economic growth (2004a:8).

This overall framework, when coupled with India’s polity, meant that the state developed an upper and a lower threshold on performance. While the commitment to democracy, and the ensuing proliferation of interest groups and demands, militated against superior economic performance, the possibility of regime change through elections also ensured a minimum level of competence.

---

4 Bardhan portrays these classes as imposing constraints on the state rather than having captured it. For a more expanded discussion on this topic, see Jenkins (1999:30-36).
5 Kohli contrasts this with what he calls ‘cohesive-capitalist’ states who ally with ‘capital-owning elites’, where the ‘state’s near-exclusive commitment to high growth coincided with the profit-maximizing needs of private entrepreneurs’ (2004a:7). The prime example of such a state is Korea. This argument is broadly similar to Evans’ laid out in Chapter Two.
Thus, while the INC assumed power with uncontested legitimacy, its ability to successfully pursue state-led industrialisation was constrained by its unclear mandate and the existence of powerful interest groups. The state did not explicitly ally itself with one particular interest group, but rather attempted to please all of them with negative implications for economic growth and transformation.

The Institutional Context

This section will discuss how relevant institutions were influenced by these political struggles, and in turn shaped subsequent political developments and policy outcomes. This section will concentrate on the Constitution, which established central and state government responsibilities and revenue sources, and the Planning Commission, which was envisaged as a pilot agency to provide direction to the industrialization effort.

The Constitution

In addition to the perceived link between poverty reduction, rapid industrialization, and centralized planning, fears of the country’s fragmentation along religious and ethnic lines favoured the creation of a centralized form of government (Mawdsley 2002:38-39). However, although the Congress party leadership sought to advance the goals of centralized planning in shaping the country’s emerging institutions, its members were influenced by their constituencies.

The 1950 Constitution set out central and state government responsibilities, and included an additional list of concurrent responsibilities. The central government’s list was the longest

---

6 The various provinces and Princely States were grouped into 14 units that were 'economically viable and administratively convenient', as opposed to regions characterized by a particular ethnic or linguistic affinity. This has given rise to a variety of linguistic and regional movements calling for the creation of separate states along religious or linguistic lines. Over time, the central government has given into demands for the creation of states along linguistic lines. The most important redrawing of states occurred in 1956, although three new states were created as recently as 2000.

7 The Constituent Assembly was tasked with drawing up the Constitution. Its members were elected indirectly by members of provincial legislatures and more than 80 per cent of its members belonged to Congress (Chatterjee 1997:5).
and included items such as defence, international relations, currency management, banks and insurance. In addition, the central government was given the prerogative in the event of a disagreement with state governments.  

However, state-level elites in the Congress party pushed for a wider range of responsibilities to be allocated to state governments, in particular those associated with the administration and governance of agriculture. Thus, the state governments’ list came to include agriculture, infrastructure, water supply, irrigation, as well as health, education, justice administration, local government and urban development (Frankel 2005:80-81, Reddy 1988:60).  

In spite of this, various provisions increased the central government’s power vis-à-vis the state governments. The concurrent list of powers meant that the central government could intervene in matters of higher education, power development, population control, social security, and the all-encompassing and much-used provision of ‘economic and social planning’ (Guhan 1995:127).  

This power structure was reinforced by several extra-constitutional mechanisms. The first was the Planning Commission which, while a central government institution, was responsible for planning and channelling grants to industrialization efforts throughout the country, including at the state level. Second, the location of public sector enterprises was centrally-decided, as were the approval of licenses and controls for private sector companies - meaning that state governments competed against each other for federally-decided funds and projects (Thimmaiah 2000:15, Bagchi 2003:24, Sinha 2004:61).

---

8 The central government can, with a parliamentary majority, create new states and re-draw the borders of existing ones. Furthermore, through ‘President’s Rule’ the central government can dissolve an elected state government, should there be a ‘threat to order’. (Singh and Verney 2003:2)  
9 Frankel looks at the relationship between rural elites and Congress. According to her, at independence, the INC was weakened by its scarce presence in many parts of the country, particularly in the former Princely States. Thus, in order to gain votes in these areas, Congress allied itself with elite landowning castes who could deliver large banks of voters, mostly comprised of peasants working their land. This alliance enabled Congress to be the sole party with national reach, winning virtually all state government elections until 1967 (1978:74).  
10 In addition, many all-India services such as the IAS, police, and army were placed under the control of the central government. Furthermore, priority policies such as the provision of universal access to primary education and affirmative action policies for scheduled castes and tribes were formulated at the central level, but had to be implemented by state governments (Reddy 1988:61).
This was further compounded by a ‘vertical fiscal imbalance’. As with Malaysia, the revenue sources allocated to the states in the Constitution were not commensurate with their responsibilities – as, with the exception of sales tax, all important revenue sources were attributed to the centre. On average, state governments financed about 45 per cent of their expenditure from their own income, with the remainder consisting of transfers from the central government (Rao 2003:46, Guhan 1995:127). There was no formula for calculating these transfers, which further augmented the central government’s discretionary power (Jenkins 1998:189).

Thus, as with Malaysia, India developed a largely centralized federal government structure. In addition to the bulk of responsibilities being allocated to the central government, various extra-constitutional mechanisms as well as a fiscal ‘imbalance’ made central government presence pervasive. However, state governments still possessed a wider range of responsibilities than did their counterparts in Malaysia.

**The Planning Commission**

Nehru and the Congress leadership envisaged the creation of a Planning Commission (PC) to provide overall direction to the country’s industrialization drive. The PC’s role was to pinpoint industrial sectors for priority action and channel available resources towards them. The main outputs of the Commission were the much-cited Five Year Plans.

However, opposition to the establishment of the PC came from two quarters. The first was from other powerful government ministries such as Finance and Commerce, who saw the creation of an over-arching body as an erosion of their authority (Chibber 2002:962).

The second was the business community, which was uneasy about bestowing wide-ranging oversight powers to a government body. On one hand, the business sector was supportive of India’s self-reliant stance, as local industrialists would receive state support and be able to move into market sectors formerly occupied by the British. On the other, it was also rational for organized business to oppose giving the state the power to oversee or ‘discipline’ firms to meet production targets or quotas (Chibber 2003:130-31).
Although the business community was unable to prevent state intervention in the economy *per se*, it was able to derail attempts to instil mechanisms to oversee and discipline it (Chibber 2003:132-35). This was accomplished by investment slowdowns and lobbying the pro-business faction of Congress. Given the delicate post-war economic situation and the support of significant party factions, the Congress leadership had to give way (Tomlinson 1993:169, Chibber 2003:170-75).

Therefore, when the Commission was created in 1950, the original plans were scaled back. Rather than being a body with the power to command other ministries, the PC was superimposed on existing state institutions and limited to providing planning recommendations — with no binding power. In addition, ministries charged with providing detailed industry information to the PC withheld or delayed their reporting. Thus, the Five Year Plans ‘were formulated on an exceedingly narrow informational base, and more important, without the administrative means to translate them into coherent, and consistent, policy’ (Chibber 2002:966).

This ‘disconnect’ also affected the granting of licenses and concessions, which were meant to channel investment to strategic areas. In particular, the Licensing Committee, which was supposed to approve investment licenses, found that the economic reality it faced differed markedly from that portrayed by the PC. In time, it came to disregard the PC, and allocated licenses according to its own criteria (Chibber 2002:968).

Just as the Planning Commission did not have the power to demand compliance from other government agencies, it was similarly unable to do so from the business community. Protracted negotiations resulted in the establishment of industry bodies (called Development Councils), which were tasked with setting targets for each sector and tracking industry performance. However, participation in these bodies was voluntary and their resolutions non-binding. The failure to instil some mechanism for planning, monitoring, and discipline was to have serious long-term consequences, as while firms were given subsidies and protection to expand into new sections of the domestic market, they had no incentives to upgrade or innovate (Chibber 2003:154-57).
Thus, in spite of the central government's considerable powers, the institutional machinery necessary to oversee rapid industrialization was crippled. Far from being a unified collection of institutions, the Indian state's effectiveness was hamstrung by inter-ministerial rivalry. In addition, while the state was in a position to channel capital to the private sector, it was unable to establish performance benchmarks or discipline firms.

Policies

Following the ideological predilection for centralized planning and state intervention in the economy, the Congress leadership sought to clearly demarcate the extent of state activity in the economy.

The Planning Commission, charged with overseeing the country's industrialization drive, formulated the first Five Year Plan in 1951. Investment goods were privileged above consumption goods, with the responsibility for the first attributed to the state and the second to the private sector (Rothermund 1993:130-31).

Given the country's good post-War situation and the small size of the Plan budget, the effects were limited. However, the Plan was accompanied by the far-reaching Industries Act of 1951. This required all manufacturing firms to obtain licenses from the government for: a) engaging in a new industrial activity b) making a new product c) expanding production of an existing product d) changing the location of a manufacturing plant. This was also accompanied by regulations on imports, pricing, and foreign exchange (Tomlinson 1993:171-72, Degnbol-Martinussen 2001:85).

The Second Five Year Plan, spanning 1956-1961, was more ambitious and sophisticated. As before, investment in heavy industries was the priority for state investment, with cottage industries left to the private sector (Rothermund 1993:131).

The Plan was accompanied by the Industrial Policy Resolution of 1956 (IPR 56). The Resolution clearly set out the extent of state involvement in the economy, dividing the industrial sector into three groups. The first consisted of strategic and capital industries
such as atomic energy, iron and steel, arms, electronics and mining. This sector was to be exclusively state-led, although existing private sector concerns would be allowed to operate. The second comprised sectors that allowed new private investment, but that were to be progressively more state-owned. This encompassed light manufacturing such as machine tools, plastics, and alloys. The third sector included all remaining sectors, which were to be developed by the private sector (Rothermund 1993:132, Brunner 1995:36).

The Third Five Year Plan (1961-1966) did not alter the structure set out by the previous Plans, although it dedicated more funds to infrastructure and set the target for India to be self-reliant in manufactured goods within ten years.

While the Five Year Plans did provide an overall framework for the economy, they were not necessarily implemented accordingly. The Planning Commission’s lack of formal authority and partial access to information meant that many strictures regarding sectors for priority investment were not implemented. The Licensing Committee was confronted by the rather theoretical Plans on one hand and a significantly different reality in implementation on the other. Thus, requests for licenses came to be granted on their feasibility rather than any relationship to the Plans themselves (Chibber 2002:968).

Outcomes

The growth outcomes of this period were, in general, positive. During 1950-1964, GDP increased by 3.7 per cent annually. During the same period, the industrial sector grew at 7.4 per cent, and by 1964 was 2.8 times its 1950 level. Agriculture, for its part, experienced a more modest growth rate of 3.1 per cent (Kohli 2004a:258, Rothermund 1993:133).

The industrial approval system was a mixed success. The licensing system contributed to a more self-reliant and diversified industrial sector. India was able to produce 95 per cent of its manufactured goods and 100 per cent of its consumer goods, and its industrial structure was much more developed than those in countries of a comparable income level. However, this policy also led India to specialise in areas where it did not enjoy a comparative

In addition, while the state was committed to reducing poverty and inequality, the effects of its industrial policy differed significantly from what was intended – as the industrial licensing scheme most probably reinforced the concentration of wealth. Due to their complexity and high transaction costs, these licenses acted as an entry barrier for smaller firms and encouraged patronage links between big business and bureaucrats. In addition, the limited number of licenses given for a particular sector, coupled with restricted international investment, discouraged innovation and encouraged large conglomerates to diversify into existing market sectors, rather than developing new products (D’Costa 2000:144, Degnbol-Martinussen 2001:112, Tomlinson 1993:177).

While the industrial sector grew during this period, the same cannot be said for exports. They tended to be a residual activity for unexpected surpluses, or for traditional sectors like tea, coffee, and handicrafts. Furthermore, firms seeking to export had to maneuver past a series of government agencies, which increased transaction costs and risk. This, coupled with the implementation of ISI, was to have dire effects on firms’ desire to increase their export competitiveness (D’Costa 2000:144, Tomlinson 1993:181).\textsuperscript{11}

\textbf{Summing Up}

This section has argued that despite initial circumstances favourable for the emergence of a developmental state, such as a capable bureaucracy, good relations with the private sector, and a commitment to economic growth, the reality proved somewhat different.

Despite its legitimacy, the Congress party was hampered by its weak organizational structure and the existence of powerful interest groups. The state’s commitment to a variety of goals and attempts to appease these interest groups undermined its effectiveness –

\textsuperscript{11} Due to the colonial experience, both the Congress leadership and local business viewed multinationals with suspicion. Thus, initial policy proposals tended to be very protectionist. However, over time the state came to develop a more nuanced approach to MNCs. On one hand, it sought to displace multinationals in key sectors through the creation and expansion of state-owned enterprises. On the other, it sought to court MNCs through
particularly to install or appropriate the necessary institutional machinery to oversee rapid industrialization.

Thus, despite a centralized federal framework, the Planning Commission was unable to coordinate the relevant state institutions or monitor and demand performance from private sector firms. While the economy grew during this period and the industrial sector developed, private firms moved into low-technology sectors and had few incentives to export or explore means of upgrading.

Deinstitutionalization (1964-1980)

The political panorama facing the Indian state during this period was considerably more complex than in the first years of independence. On one hand, the state still had to negotiate with established interests and reconcile the goals of democracy, socialism, and industrialization. Yet on the other, it now faced intra-party dissension, declining levels of legitimacy and support, and the proliferation of new demand groups. As with Malaysia under Mahathir, this period was characterised by declining state capacity accompanied by greater levels of authoritarianism, political instability, and rent-seeking. Nevertheless, an important ‘pocket of efficiency’ emerged in a state agency that was to lay the foundations for the development of the software sector.

The Political Context

The Rise of Indira Gandhi

After a brief interlude following Nehru’s death in 1964, his daughter, Indira Gandhi, became leader of Congress and Prime Minister in 1966. Although the Nehru Administration had enjoyed high levels of legitimacy, Congress support had begun to ebb in the early 1960s – due, in part, to acute food shortages in 1955-56, a military defeat to China in 1962, and slowing economic growth. Thus, the 1967 elections were characterised

the provision of infrastructure and incentives in other sectors where the state or private sector could not compete (Degnbol-Martinussen 2001:83).
by a mediocre electoral performance for Congress and the loss of nine state governments to opposition parties (Chatterjee 1997:13-15).

This electoral performance resulted in factional infighting that was only settled when Mrs. Gandhi decisively won the 1971 parliamentary elections. Lacking her father’s nationalist legitimacy and seeking greater levels of authority than the machinery of Congress allowed, Mrs. Gandhi expended considerable energy to establish her authority — substantially changing the country’s political reality in the process (Kochanek 1976:94, Brass 1990:38).

Mrs. Gandhi’s first conflict was with the Congress Chief Ministers, who were the elected state government leaders. Chafing under their control, she was expelled from the Party in 1969 for disobeying the Party Whip. Mrs. Gandhi retained control over the parliamentary wing of Congress, and called for elections in 1971 - as head of her own faction. These national elections were ‘delinked’ from state elections, which enabled Mrs. Gandhi to separate her political platform from state-level Congress candidates and appeal directly to voters (Brass 1990:39, Rudolph and Rudolph 1987:132-140).

Mrs. Gandhi won overwhelmingly, and set about asserting her control of Congress. She first took control of the party machinery through appointees. Reversing a slow trend towards decentralization, in 1972 Mrs. Gandhi placed the choice of state-level Congress candidates under the central party leadership, rather than having them elected by state party bodies. In addition, she availed of ‘President’s Rule’ to dissolve state governments whose leaders displeased her.12 The imposition of candidates from above caused resentment, and also meant less contact with the grassroots as fewer experienced, local politicians were chosen (Kochanek 1976:96, Rudolph and Rudolph 1987:132-140).

The Recourse to Populism

Mrs. Gandhi tried to diversify Congress’s traditional support base by appealing to groups outside the social mainstream, such as backward castes and tribes, the poor, women, and Muslims. Mrs. Gandhi shifted state policies broadly leftwards, and targeted new initiatives
to these interest groups. This included appealing to the poor through targeted welfare packages such as food-for-work programs, public distribution of food, and low-cost housing. Furthermore, big business was ‘reined in’ through controls limiting their expansion and the nationalization of key sectors and strategic firms (Chatterjee 1997:23, Nayar 1989:293-95).

Mrs. Gandhi’s leadership style became more personalistic. Her appointments to lead state governments consisted overwhelmingly of trusted aides, who in many cases did not have independent electoral support. Furthermore, rent-seeking became more prevalent as candidates were chosen on their ability to raise funds for election campaigns, and the old Congress leadership was replaced by young, more self-interested politicians (Kochanek 1976:96, 1996a:160, Brass 1990:40).

This style of governing was also applied to state institutions, with ensuing negative effects for their professionalism and autonomy. Mrs. Gandhi took direct control of key portfolios, centralized others in the Prime Minister’s Secretariat, and appointed young technocrats with no electoral base to her cabinet – constantly rotating them to preclude possible sources of political opposition. She also ensured that other political institutions, such as the Presidency, would be weak and unable to oppose her (Kochanek 1976:104-05).

Thus, after 1967, the Prime Minister and Congress party moved away from a centrist, consensual style of leadership towards increasing authoritarianism, personalistic rule, and populism.

The Emergency

The results of these policies began to be felt in 1973-74, as food shortages and the declining legitimacy of Congress-led state governments resulted in popular demonstrations and an incipient revolutionary movement. In 1975, a High Court found Mrs. Gandhi guilty of electoral fraud. Mrs. Gandhi, under the argument of imposing order, declared a state of
emergency, which was characterised by mass arrests, banning of political parties, and strict censorship.

While these measures prolonged Mrs. Gandhi’s stay in power, they ultimately undercut her popular support. The 1977 elections saw her lose resoundingly to the Janata Dal coalition, which constituted Congress’ first electoral defeat. The Janata government rolled back the repressive measures instated under the Emergency, and tried to focus attention on small farmers and businesses. However, it was riven by internal dissension between coalition members and troubled by a corruption scandal. The government was dissolved and elections called again in late 1979 (Brass 1990:40-41, Chatterjee 1997:26-29).

The Institutional Context

The political changes outlined above affected a great many of India’s institutions. For the purposes of this thesis, the two most important developments occurred in the Indian Administrative Service and the Department of Electronics.

The Indian Administrative Service

The elite bureaucracy that India inherited at independence was designed to play an administrative, laissez faire role rather than one that was proactive and interventionist. Furthermore, the Indian Civil Service’s uniform and centralized structure did not graft well onto the country’s federal structure, and its association with the colonial administration did not bode well for its future (Potter 1996:151).

Nevertheless, the Service’s high levels of capacity and extensive experience made it an invaluable asset for the country’s new leaders. Members of the ICS were recruited through competitive exams, underwent rigorous training, had esprit de corps, and were familiar with many aspects of the country’s reality. Furthermore, the Service’s top echelons were politically adroit, and adept at cultivating support among the Congress leadership.
After independence, the ICS’s successor organization, the Indian Administrative Service, retained the majority of these practices. Following established tradition, the highest levels of the central and state governments continued to be staffed by IAS officers. In particular, the Secretaries, or bureaucratic heads of key ministries, such as Finance, Commerce, and Industry were invariably from the IAS (Potter 1996:151,257).

However, the political reality after independence was to place a series of strains on the bureaucracy. The first was its growing politicisation. When Congress ruled at the central level and in almost all state governments, there was little friction between the IAS and elected government officials. However, this relationship came under strain after 1967, when Congress lost elections in various state governments, and after 1977, when it lost national elections. This was exacerbated by Mrs. Gandhi’s personalistic style of leadership as officials were promoted based on their loyalty rather than competence or tenure (Rudolph and Rudolph 1987:79).

In addition, elements of the IAS, as well as wide swaths of lower levels of government, began to succumb to rent-seeking. As part of her ‘anti-business’ stance, Mrs. Gandhi had banned corporate contributions to the Congress party – eliminating its sole legal channel of fund-raising. The need for capital to finance direct appeals to the public required copious amounts of ‘black money’ which was provided by businesses that sought tax exemptions and the relaxation of the extensive control mechanisms. This era was thus characterized by ‘briefcase politics’, which consisted of ‘mutual exchange of benefits among a triangle of businessmen, bureaucrats, and politicians’ (Kochanek 1996a:160).

Furthermore, while established business associations were unable to influence the direction of state policy, according to Kochanek ‘the regulatory and distributive character of the policy made the role of individual influence, connections and particularistic demands by business houses the dominant factor in business-government relations’ (1996a:157). In

---

13 The IAS comprises the elite level of the bureaucracy, which numbered some 4,000 officials in 1983. Below them were several layers of bureaucracy in central, state, local and quasi-government bodies, which amounted to some sixteen million in the same year (Potter 1996:213, Brass 1990:53).

14 Some tensions were to be expected, as, for example, the size of the public sector increased dramatically. Furthermore, the IAS remained a centrally-administered body, as the central government retained control over the posting of officials to all parts of the country, including state governments. In addition, as the economy...
addition to the negative effects this was to have on the integrity of the bureaucracy, the personalistic nature of the relationships between bureaucrats, politicians, and businessmen precluded more constructive forms of dialogue with the business sector as a whole.

Thus, as in Malaysia, India’s declining levels of state capacity were accompanied by the emergence of a nexus of politicians, party officials, and well-connected businessmen – with relations between the state and the private sector lapsing into rent-seeking.

**The Department of Electronics**

In contrast to the declining quality of the IAS, the Department of Electronics stands out as a ‘pocket of efficiency’, characterized by high levels of capacity, openness to innovation, good ties with the private sector, and the ability to provide coherence and vision to the electronics sector.

Following the country’s military defeat to China, India’s electronics sector began developing rapidly as the local production of technology for military purposes was encouraged. In 1965, the Electronics Committee was created to develop policy and provide guidance for the industry. However, while it was tasked with formulating policy, it had no responsibility for implementation. This was complicated by the profusion of electronics-producing SOEs, spread across a variety of ministries (Sridharan 1996:114, Parthasarathy 2004a:7).

Thus, in 1970, the Committee was re-born as the Electronics Commission, with policymaking responsibilities. The Department of Electronics (DoE) was created and charged with implementation, answering directly to the Prime Minister. While it did not take over existing SOEs, the DoE had the mandate to create necessary enterprises under its control. Directors from the former Electronics Committee were placed in top postings in the diversified and became more complex, the generalist education of IAS officials began to be questioned (Potter 1996:150-170).

15 Between the 1960s and 1980s, the central government established 13 electronics-producing SOEs and the state governments another 19 (Sridharan 1996:114).
Commission and DoE, often holding positions in both organizations to facilitate communication and harmonize policy (Parthasarathy 2004a:6).

The DoE stood apart from its public sector peers for a variety of reasons. First, it was staffed by personnel with a technical or scientific background, rather than generalist IAS officials. Second, unlike IAS officials, who were rotated every 2-4 years, personnel at the DoE tended to stay for longer periods. This enabled in-depth technical expertise to be acquired and facilitated collegial relationships and organizational cohesiveness. Third, due to the prestige of its directors, the close ties it enjoyed with the Planning Commission, and the highly technical nature of its work, the DoE enjoyed a greater degree of autonomy than most state bodies. Fourth, while businesses still needed to obtain licenses and permits from a variety of agencies, electronics policy was under the aegis of one body with technical expertise (Pingle 2000:126-30).

In addition, the nature of the electronics industry contributed to the DoE's institutional integrity. Unlike other sectors, such as agriculture, the electronics sector had no important electoral constituencies, nor did it have sufficient jobs that could be distributed for patronage purposes (as, for example, the railways). Furthermore, due to its technological intensity, it was of little interest to traditional business conglomerates that were in search of easier rents. Thus, the DoE was able to discharge its duties relatively free from the rent-seeking practices prevalent elsewhere in government (Evans 1995:115).

However, not all was positive, as while the background of DoE personnel meant greater technical expertise, they lacked knowledge of wider industrial and commercial issues. Furthermore, their lack of contacts among the IAS, particularly in key ministries like Industry, Finance, and Commerce meant delays and obstacles with policy implementation (Pingle 2000:130).

Notwithstanding the above, the sector's technical nature, coupled with the DoE's committed staff, and absence of patronage enabled the institution to innovate and move away from the excessively restrictive policy framework prevalent elsewhere. Therefore, the DoE emerged as an important pocket of efficiency within the central government, capable
of detailed communication with the private sector and feeding this information into policy-making.

**Policies**

The droughts and subsequent food crises of 1965-66, combined with a recession, resulted in the temporary suspension of the Five Year Plans. However, the drive to increase the role of the state in the industrial sector continued.

After a three-year hiatus, the Fourth Five Year Plan (1969-74) was issued. In particular, it aimed to increase the regulation of the industrial sector. The Monopolies Restriction and Trade Practices Act (MRTP) was passed in 1969, and was intended to act as a brake on the growth of the private sector by restricting areas of the economy where they could operate and requiring all firms above a threshold to apply for permission before expanding further (Nayar 1989:290-92).

This was accompanied by a wave of nationalizations in key sectors, including banking and insurance, coal, copper, wheat, and one of the country’s two steel plants. And, in 1973, the government passed the Foreign Exchange Regulation Act (FERA), which aimed to control foreign investment more closely. This limited MNCs to only owning 40 per cent of any subsidiaries in India, unless they were introducing new technology, exporting the greater part of their production, or in a strategic industry (Clark and Roy 1997:100).

The Fifth Five Year Plan (1974-79) did not contain any significant departures from the deregulation of agriculture, promotion of state-led industrialization, and heavy regulation of the private industrial sector. However, the limits on the state’s capacities to foster further economic growth began to appear (Frankel 1978:501-04).

**Electronics and Software Policies**

The electronics and computer sectors were not mentioned in the Industrial Policy Resolution of 1956, developing without much direction until the creation of the Electronics
Committee and, subsequently, the DoE. Domestic production was in the hands of a variety of uncoordinated state-owned enterprises, and local private sector participation was limited due to the sector's technological intensity and the small size of the domestic market. Up until the 1970s, the computer sector was dominated by two multinationals, International Business Machines (IBM) and International Computers Ltd (ICL).

The 1973 Computer Policy

In 1973, the Electronics Commission and DoE released the first Computer Policy, which was influenced by the prevailing ideas of state intervention and self-reliance. Thus, the Policy argued for temporary importation of computers for five years, after which production was to be met locally. In addition, it also set the goal of attaining local production of peripherals.

However, the Computer Policy also contained important provisions that were to help the software sector's long-term development. In particular, the DoE quickly recognized the potential of software to generate employment and foreign exchange. Thus, the 1973 Policy facilitated the importation of hardware imports for software entrepreneurs targeting the export market. This was followed by the creation of the Santa Cruz Export Zone in Mumbai in 1973, where participating firms were allowed to import new hardware, provided they produce a set quantity of software for export. This was complemented in 1976 by a scheme to attract investment from Non-Resident Indians (NRIs) (Parthasarathy 2004a:8).

However, these schemes met with only moderate success. While the provisions of the Computer Policy were helpful, local entrepreneurs still had to work in very difficult circumstances, with restrictions on the import of hardware, little access to foreign exchange, and excessive amounts of paperwork. Furthermore, given the pent-up domestic demand for hardware and software, firm owners had considerable incentives to by-pass restrictions on targeting the local market or re-selling hardware (Parthasarathy 2004a:9).

The 1973 Computer Policy also faced other problems in achieving its goal of local production of small and medium computers. Although the DoE supported the 'national champion', the Electronics Corporation of India Limited (ECIL), through restricting the
entry of other firms into the computer sector, the company was unable to effectively meet local hardware and software demands.\textsuperscript{16}

\textit{The 1978 Computer Policy}

While the 1973 Computer Policy was reflective of the mindset of the time, the 1978 Computer Policy was to mark an important departure. The 1978 Policy’s most important provision was to allow the entry of private capital into specific segments of the computer market.\textsuperscript{17} In particular, SMEs were allowed to design and assemble computers. While the Policy imposed a series of constraints on these firms, such as production and price ceilings, four local enterprises quickly began production. These firms cornered 75 per cent of the market between 1978 and 1980, and ECIL’s market share fell to 11 per cent from 50 per cent. The DoE proceeded to allow more entrants, which grew to 30 by 1980 (Grieco 1984:137, Parthasarathy 2004a:10).

This budding hardware-producing sector in turn generated more demand for software, which flourished behind the country’s formidable import restrictions. Many of these small entrepreneurs had worked for IBM or ICL, and were in a good position to move into this new market. While the domestic market was limited in size, they were able to make products in local languages, and reverse-engineer existing packages to produce them at a lower cost (Lema and Hesbjerg 2003:53).

Thus, the 1978 Computer Policy was a radical departure from the policy conventions of the time. The DoE, in contrast to other sections of the Indian state, correctly perceived that its efforts to restrict entry to the computer sector and to foster a national champion were unproductive. Thus, in a remarkably short time, it changed tack and encouraged private sector participation. This built on previous policy measures, such as liberalizing access to

\textsuperscript{16} ECIL’s products were more expensive than goods available outside India, very often delivered late, and comparatively unsophisticated. Furthermore, the software that it produced was of bad quality, but customers buying its hardware were forced to use it. In addition, ECIL – like other SOEs – had to perform a variety of social functions, which decreased its efficiency (Pingle 2000:124).

\textsuperscript{17} While the 1978 Policy was more favourable to the local private sector, it retained a suspicion of foreign investors. Thus, in spite of considerable market demand, and the middling performance of state-owned enterprises, the state restricted the activities of IBM and ICL. The FERA required foreign companies to dilute their equity in their Indian affiliates and the 1978 Computer Policy upheld this. ICL acquiesced and was
imports and providing specialized infrastructure to attract investment, as the DoE correctly perceived the long term employment and income generating possibilities of the software sector.

Outcomes

The late 1960s and 1970s were marked by a slowdown in economic growth. India’s GDP increased at a rate of 3 per cent p.a. between 1965 and 1979, lower than during the 1950s. In addition, due to a high population growth rate, GDP only increased 0.6 per cent per capita annually – insufficient to significantly reduce poverty. Thus, GDP per capita only climbed from US$ 187 in 1965 to US$ 213 in 1979. In many ways, the Indian economy was saved by the Green Revolution, which dramatically increased agricultural yields during the 1970s and generated surpluses of crops and capital (Jha 2002:169).

However, the situation regarding industry during this period was much less positive, as it was characterized by: decreased investment; low productivity growth; and inefficient resource management. By the end of the 1970s, the public sector had come to dominate the economy, accounting for 80 per cent of all investment. However, investment levels were falling due to the state’s inability to raise revenue, cut inefficient subsidies, and invest in key infrastructure. In addition, the private sector was wary of expanding operations for fear of being nationalized, and the protection offered to SMEs reduced incentives for them to grow or innovate (Sinha 2004:28, Degnbol-Martinussen 2001:114).

This also affected foreign investment and trade. FDI decreased drastically and by the mid-1980s was only one-third of its 1960 level. Manufactured exports also fell, with India’s share of the developing country total decreasing from 22 per cent in 1962 to 3.4 per cent in 1980. In addition, a significant amount of growth was in low-skill sectors like jewellery and handicrafts (Clark and Roy 1997:100, Cable 1995:214).

18 allowed to maintain its operations in the country. IBM was unwilling to reduce its holdings in its Indian operations and, as a result, was forced to leave India (Grieco 1984:139, Lema and Hesbjerg 2003:53).

\[ \text{constant 2000 US Dollars.} \]
However, the electronics sector increased substantially during the 1970s, climbing from US$ 231 million in 1971 to US$ 993 million ten years later. However, Indian products were much more expensive than those on the international market and exports were negligible (Sridharan 1996:128). As mentioned above, electronics-producing SOEs were uncompetitive and largely unable to meet domestic demand. However, the 1970s witnessed the birth of a small, local software-producing sector that catered to the incipient local market and was beginning to export. In 1975, local firms exported US$ 1 million, which increased almost four-fold to US$ 3.6 million only three years later (Pingle 2000:121).

**Summing Up**

During the late 1960s and 1970s, following intra-party strife, Indira Gandhi centralized and personalized the exercise of power, weakening her party, the bureaucracy, and a plethora of state institutions in the process. In particular, the relations between the private sector and wide swathes of the bureaucracy came to be characterised by rent-seeking. Populist measures, coupled with increasing regulation of the economy, saw economic growth stagnate.

However, an important pocket of efficiency was established in the Department of Electronics, which was more insulated from patronage and staffed by personnel with relevant technical knowledge. This resulted in important policy changes in the IT sector, away from fostering state-led production of hardware towards a more open stance toward the local private sector and actively fostering the software sector.

**Laying the Foundations (1980-1991)**

While many conventional accounts of Indian economic policy focus on the dramatic changes of 1991, the country’s political, institutional, and policy context began to change in important ways during the 1980s. In particular, the state allied itself more explicitly with the private sector, with government policy shifting away from an emphasis on state-owned enterprises and heavy regulation towards a more consistently ‘business-friendly’ stance.
Furthermore, these gradual moves towards de-regulation, combined with constant communication between the DoE and emerging entrepreneurs, were to result in important developments in the software sector.

The Political Context

Indira Gandhi's Return

Mrs. Gandhi returned to power in 1980, only three years after her resounding electoral defeat. However, her approach and policies differed markedly from those she previously espoused. In particular, despite the Party's long-standing commitment to socialism and secularism, policies became more pro-business, anti-poverty initiatives de-emphasized, and appeals made along communal lines.¹⁹

As before, these policy changes were based on political calculations. Mrs. Gandhi and her advisers surmised that the 'populist socialism' espoused during the 1970s was unlikely to attract more votes or foster higher levels of growth. In particular, they may have attributed inefficient SOE performance, stagnating government revenue, and the country's middling industrial growth to the limits of the socialist model.

However, Mrs. Gandhi perceived that while the anti-poverty programs and nationalization drives were not particularly effective, they served to increase her support among the poor. Realizing that this support was based more on ideology than tangible results, Mrs. Gandhi maintained a rhetorical commitment to socialism while reaching out to other interest groups (Kohli 1989:309).

¹⁹ The 1977 defeat showed that Congress had lost support in the large, predominantly Hindu states of the north. In order to shore up support in these constituencies, the Congress Party deviated from its long-standing commitment to secularism. Appeals along communal lines, combined with mass rallies, were to prove very effective at mobilizing large numbers of voters in the 'Hindi Heartland'.

260
The Rapprochement with the Private Sector

The election defeat also showed that the business community’s political and financial support for Congress had waned. Thus, Mrs. Gandhi began a gradual *rapprochement* with big business. This was manifested by moves to ‘tame’ organized labour, increased investment in infrastructure, and incipient economic liberalization. However, liberalization did not mean exposing local firms to international competition, but rather decreasing the amount of regulatory controls that they were subjected to. This change in emphasis was to have important implications for the economy, as it marked the prioritisation of economic growth above commitments to equity and socialism. Furthermore, these reforms were successful and not overtly opposed, because they were small, piece-meal, and presented as technical modifications of existing policies (Kohli 1989:311).

Rodrik and Subramaniam look at the development of India’s economy after 1980, arguing that it is precisely these piece-meal policies enacted during the 1980s, rather than the visible liberalization of 1991, that laid the foundation for high growth rates (2004:15). However, they argue that while the state became more business-friendly, it was not necessarily ‘pro-market’ as this would have entailed support for economic liberalization and a reduction in barriers to the international economy. Rather, a ‘pro-business’ stance entailed a support for the growth of existing, large-scale business concerns. Thus, Rodrik and Subramaniam state:

> When Indira Gandhi returned to power in 1980, she re-aligned herself politically with the organized private sector and dropped her previous rhetoric. The national government’s attitude towards business went from being outright hostile to supportive...Indira Gandhi was far less interested in opening up the economy and removing impediments to competition than in garnering political support from existing business groups (2004:2-3).

While Mrs. Gandhi effectively changed the emphasis of state policies, she ultimately succumbed to the communal forces she had unleashed and was assassinated in 1984. Her son, Rajiv Gandhi, assumed leadership of Congress and convincingly won elections later that year.
Rajiv Gandhi

Rajiv presented his administration as a new beginning, pledging economic liberalization, a reform of the Congress party, and the curbing of corruption. Thus, public commitments to socialism were curtailed and economic liberalization, access to technology, and competitiveness were emphasised (Kochanek 1986:1284, Kohli 1990:339).

However, Rajiv’s ability to affect change was dramatically affected by the political context. After an initial burst of activity in 1985-87, Rajiv’s political capital began to decline and opposition to reform mounted. In part, this was a legacy of Congress’s de-institutionalization, which made it difficult to translate political support for individual candidates into support for concrete policies. Thus, while Rajiv was initially popular, this support was linked to his association with the Nehru/Gandhi dynasty, and not a specific policy package (Manor 1988:88, Kohli 1990:386).

So, while Rajiv had the support of the business class and the growing urban middle class, he faced opposition from a variety of sectors. This included: Congress party ranks, who opposed the end of the commitment to socialism; organized labour, who did not agree with the overt support that business groups were getting; and the middle peasantry and rural poor, who did not stand to gain from his policies (Kohli 1990:324-38).

While this opposition did not stop the momentum for reform, it slowed it considerably. After 1987, policies became more ad hoc and reactive. The Opposition successfully labelled Rajiv’s administration as pro-rich which, combined with increasing inflation, mobilised lower-income groups. Furthermore, Rajiv’s image was not helped by a series of corruption scandals or India’s military involvement in Sri Lanka. In 1989, Congress lost the national elections, marking only the second time since independence it was to lose power. However, the proceeding administrations were short-lived, with two forming and collapsing in a space of two years (Denoon 1998:52, Kochanek 1996a:163).
The Institutional Context

The Department of Electronics

During the 1970s, the DoE had been able to quickly recognize the limits of state-owned enterprises, and in particular ECIL, to meet local hardware and software needs. Its bureaucratic autonomy, personnel profile, and its limited appeal for rent-seeking further contributed to its bureaucratic effectiveness. During the 1980s, the DoE was able to adapt and change its functions in line with new requirements.

The Computer Policy of 1978 had changed the structure of the hardware and software industries significantly, through allowing the entry of a variety of small, local firms. As such, the DoE’s tasks changed, moving away from liaising exclusively with the heads of large public enterprises and MNC managers to include dealing with small, local start-ups. However, this was a job to which the DoE was well-suited, as the greater part of its personnel shared social and educational links with the emerging entrepreneurial sector (Pingle 2000:137).

In addition, the long tenures of DoE staff enabled relationships to be established with businessmen. This detailed communication gave DoE personnel a good grasp of the issues that firms faced, and was to prove particularly useful for improving policies as they were implemented. In addition, the small size of these firms and their limited financial resources precluded significant amounts of rent-seeking. This institutional ‘integrity’ was further supported by the benefits that software firms sought – as they strove to gain access to international markets rather than protection from competition (Pingle 2000:147).

The DoE received a boost from Rajiv Gandhi, who had a personal interest in the electronics sector. This high-profile backing, coupled with the constant and detailed information the DoE was receiving from entrepreneurs, put it in an ideal position to push for policy changes. In addition, the DoE’s ability to influence policy was bolstered by an influx of IAS officials, which greatly facilitated communication and coordination with other ministries (Evans 1995:114, Pingle 2000:146).
Therefore, the Department of Electronics continued to act as a pocket of efficiency, evolving in tune with the software sector’s emerging requirements and the changing composition of its entrepreneurs. In addition, its effectiveness was bolstered by high-level political backing and an infusion of well-connected career bureaucrats.

Policies

The 6th Five-Year Plan (1980-85) contained many elements of India’s traditional state-guided industrial policy. Notwithstanding this, important technical changes were made in the content and form of many regulations. These were specified in the 1980 Industrial Policy Statement, which included the following: firms and factories in key sectors were allowed to increase their production capacity (which had previously required government permission); the threshold for firms to qualify as SMEs was raised (which entailed less regulation and taxation); and expenditure on SOEs was reduced and coupled with productivity-enhancing measures (Pingle 2000:24).

In addition, Mrs. Gandhi negotiated the country’s first loan with the IMF in 1981. This agreement was accompanied by various measures such as: the rolling back of price controls on key inputs like steel and cement, temporary lifting of restrictions on manufactured imports, and encouraging access to foreign technology. Furthermore, investment approvals were given more freely, and ‘automatic licensing’ was implemented in 20 industries, essentially entailing free entry by the private sector. Access to credit was liberalized, and additional revenues also raised in order to invest in infrastructure (Kohli 1990:310).

The 7th Five-Year Plan, implemented under Rajiv Gandhi, took these measures further. As with the measures formulated under Indira, the changes constituted piece-meal advances, rather than a wholesale change of approach. In general, they served to reduce the regulatory burden on firms, without removing protection from the international economy (Kochanek 1986:1299).

Thus, the licensing requirements for a variety of industries were removed, 28 industries were opened to private sector activity, and firms in other sectors were allowed to expand
production capacity without applying for licenses. Furthermore, import quotas were replaced by tariffs, financial markets were liberalised, the Rupee was devalued and tax incentives were given to exporters. Tax cuts, largely for the middle classes and businesses were implemented, but expenditure on infrastructure was increased (Kohli 1990:305, Rodrik and Subramaniam 2004:20).

While these changes were important, they must be kept in perspective. The continuing protection of domestic firms hampered attempts to develop the export sector, as profits from targeting the domestic market were two to four times higher than what could be obtained through exporting. And, between 60-80 per cent of the industrial sector was still monitored by the state through licenses and controls (Jha 2002:171).

The Electronics and Software Sectors

The software policy framework advanced a great deal during the 1980s, as the DoE progressively relaxed its regulatory oversight and then began to promote the software sector.

The 1984 and 1986 Computer Policies

Benefiting from Rajiv’s ascension to power, the Computer Policy of 1984 was passed in the first month of his tenure. It marked the first important attempt to de-regulate the computer sector and, in a radical departure from the norm, incorporated hardware manufacturers and industrialists in the policy-making process (Parthasarathy 2004a:11).

The Policy simplified import procedures and deregulated the hardware sector, allowing any Indian firm to manufacture mini and microcomputers and removing restrictions on production capacity. The procedures for all necessary permits and licenses were centralized for the first time in a ‘single window’ in the DoE. Furthermore, to expedite matters, any
application that could not be decided upon within two months would be automatically approved (Subramaniam 1992:63, Parthasarathy 2004a:13). 20

Regarding software, the DoE set up a promotion agency and research facility to develop the sector. The Department correctly perceived that software SMEs were crucially affected by a lack of marketing expertise and skills. Thus, the DoE began to implement market-complementing measures such as providing marketing seminars and organizing media events and fairs overseas to promote the sector. Duties on software imports were also lowered, and software was recognized as a regulated ‘industry’, allowing it to qualify for incentives – but freeing it from location restrictions. The Policy also classified body-shopping as an export, even though the labour took place outside of India (Dataquest 31/05/1999, Parthasarathy 2004a:11-12)

This was followed by the Policy on Computer Software Export, Software Development and Training in 1986. The Policy specifically aimed to increase the country’s export potential through facilitating access to the most updated technology. Thus, the import of software was liberalized, enabling anyone paying 60 per cent duty to bring in software and procedures for procuring hardware were streamlined (Parthasarathy 2004a:15).

Active Promotion

In 1989, the DoE established the Electronics and Computer Software Export Promotion Council (ESC). The Council attempted to reduce information and coordination externalities by helping firms in the IT sector export their products through matchmaking, providing research and market intelligence, and promoting the industry abroad. In addition, the Council set up a business incubation centre in the US, and organizes a yearly exhibition for Indian firms (ESC 2003:3-5).

In 1990, the DoE created the Software Technology Parks of India (STPI) initiative to offer software exporters dedicated infrastructure and facilities. Thus, participating firms were allowed to procure equipment locally and import hardware without obtaining a license or

20 As a result, local manufacture of computers increased from 3,400 in 1984-85 to some 33,000 in 1987-88. In addition to easing local demand for hardware, it also bolstered demand for software.
paying duty. The participation of foreign firms and repatriation of profits was also allowed, facilitating foreign investment immensely. However, in order to qualify, firms were required to meet export targets based on the value of goods they imported. STP branches were set up in three cities in 1990, each possessing computer facilities, office space, uninterrupted electricity, as well as internet and high-speed data access for firm owners (Parthasarathy 2000:329-30).

In addition to the DoE's incipient promotion efforts, the software sector was to benefit indirectly from other policies, in particular education. Partly to cater to the emerging middle class, education spending had traditionally been regressive as insufficient resources were dedicated to primary and secondary education. However, university education was heavily subsidized, with the government providing more than 90 per cent of current costs in public colleges and universities. This, in addition to the sheer size of the Indian education system, as well as mismatches between the profiles of graduates and job requirements led to many educated and unemployed workers. This pool of workers was to then provide the emerging software sector with a huge potential labour-force (World Bank 2000:16-18, Parthasarathy 2004a:14).

Outcomes

The moves to de-regulate and liberalize the economy paid dividends, as the economy began to improve markedly. GDP growth climbed from an average 3.2 per cent p.a. during 1964-79 to 5.9 per cent p.a. during 1980-90 (WDI Online). This jump in growth was coupled with a slight decline in the rate of population growth, resulting in important gains in per capita income and poverty reduction. As seen in Diagram 7.1, GDP per capita only increased slightly between 1960 and 1980. However, it began to climb rapidly during the 1980s, climbing from US$ 220 in 1980 to almost US$ 320 by 1990.

This was partly underlain by significant growth in the industrial sector and an expansion in trade. As Table 7.1 shows, industrial growth increased from a low of 2 per cent in the early 1970s to more than 5 per cent in the late 1970s, and more than 6 per cent in the 1980s.

Similarly, trade began to expand, climbing from below 10 per cent to nearly 15 per cent during 1980-84, before falling to 13.5 per cent in 1985-89.

Diagram 7.1

![Diagram 7.1: GDP per capita (1960-1990)](image)

Source: WDI Online

Table 7.1  
Selected Industrial Statistics (1964-1979)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry (growth p.a.)</td>
<td>4.9</td>
<td>2.0</td>
<td>5.3</td>
<td>6.0</td>
<td>7.6</td>
</tr>
<tr>
<td>Trade (% of GDP)</td>
<td>9.8</td>
<td>8.9</td>
<td>13.8</td>
<td>14.7</td>
<td>13.5</td>
</tr>
</tbody>
</table>

Source: WDI Online

While the industrial sector’s jump in growth due to reduced transaction costs was important, it is equally notable that it was based on higher productivity and the emergence of new market segments. Sectors like cement, cotton, food processing, textiles, and automobiles were modernised, and production began in sunrise industries such as semiconductors (Nagaraj 2003:3707).

---

Table 7.2  The Number of Indian Software Firms (1981-1990)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>DoE registered firms</td>
<td>21</td>
<td>15</td>
<td>20</td>
<td>35</td>
<td>35</td>
<td>60</td>
<td>85</td>
<td>90</td>
<td>120</td>
</tr>
<tr>
<td>All firms</td>
<td>271</td>
<td>360</td>
<td>560</td>
<td>700</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Heeks (1996:87)

The software sector began to grow rapidly in this new climate. Initially concentrating in the Santa Cruz Export Zone in Mumbai, firms began to emerge throughout the country. At the beginning of the 1980s, there were some 20 firms registered with the DoE. By 1990, this number had increased to 120, with an estimated 700 firms operating throughout the country.

Similarly, as can be seen in Diagram 7.2, software exports expanded throughout the 1980s from approximately US$ 4 million in 1980 to US$ 130 million by 1990-91.

Diagram 7.2

![Gross Indian Software Exports](chart)

Source: Heeks (1996:73)

Furthermore, international investments began to arrive in India. After protracted negotiations, Texas Instruments set up a subsidiary in Bangalore in 1987. The DoE’s role
was pivotal in getting all necessary approvals – with the Director openly admitting that Department had broken more than 20 regulations to facilitate the process (Evans 1992a:7).

While the state cut direct taxes and invested more in infrastructure, this was not financially sustainable. The combined deficits of the central and state governments began to rise alarmingly, climbing from 6.3 per cent in 1981-82 to 9.4 per cent by 1990-91 (Parthasarathy 2004c:38). This decline in the country’s fiscal health was to set the stage for the next round of policymaking.

**Summing Up**

This section has argued that the Indian state became markedly more pro-business after 1980, rolling back the regulatory burden on the private sector but maintaining barriers to international competition. While not full-fledged liberalization, these policies boosted the growth rate considerably – albeit to the benefit of large, established firms.

Due to the composition of its personnel, embeddedness with local entrepreneurs, and absence of entrenched interests in the software sector, the Department of Electronics continued to act as a pocket of efficiency within the Indian state. Well ahead of other sectors, the software sector was de-regulated, exports were encouraged, and specialist facilities provided for firms. As a result, the software sector grew rapidly during the 1980s, reaching some 700 firms and more than US$ 130 million dollars in exports by 1990.


The 1990s are known for the country’s economic reforms and ‘opening up’ to international market forces. However, while the state implemented a series of liberalization measures, they are best seen as continuing, rather than departing from, the ‘pro-business’ drift that began the previous decade. Regarding software, the sector developed quickly, spurred by the liberalizing and promotional policies set in place during the 1980s. The development of the sector was further aided by the emergence of a dynamic business association.
The Political Context

The Indian political scene witnessed significant changes during the late 1980s and the 1990s. Congress's ability to retain nation-wide support was declining, a variety of regional and one-state parties were emerging, and communalism was now a burning political issue. This period was characterised by more short-lived and unstable administrations, but the decline of one-party dominance also meant that interest politics became 'less individual, patron-client, and particularistic and more collective, open, and genuinely pluralistic' (Kochanek 1996b:529, Mawdsley 2002:34). In spite of this greater political volatility, the administrations in power during this period did not fundamentally deviate from incremental progress towards liberalization (Kohli 2004b:279).

The 1991 Reforms

Following the assassination of Rajiv Gandhi, Congress won the 1991 elections. The new administration had to deal with a serious economic crisis, which set the stage for the first round of economic liberalization.²⁴ In spite of its scant electoral majority, Congress was able to capitalize on the crisis as well as the opposition parties' electoral weakness to implement a series of far-reaching reforms.

Thus, the government negotiated loans from the IMF and World Bank, devalued the Rupee by 20 per cent, and tightened monetary and fiscal policy. Regulatory controls on economic activity were rolled back and, with the exception of a few strategic sectors, industrial licensing was repealed and opened up to the private sector. Foreign direct investment was also solicited and controls on equity loosened. In addition, trade policy was liberalized and quotas replaced with tariffs. These measures resulted in an immediate and marked

²⁴ GDP growth fell from 5.4 per cent in 1990-91 to 0.8 per cent in 1991-92, the fiscal deficit passed 9 per cent of GDP, inflation rose, and the current account deficit reached US$ 10 billion. Internal debt had reached 55 per cent of GDP and interest payments consumed 20 per cent of current expenditure as a result of tax cuts and increased investment in infrastructure. This was aggravated by the Gulf War, which contributed to a shortage of foreign exchange through rising oil prices and reducing remittances from workers in the region. Thus, reserves of foreign exchange fell to the equivalent of two weeks of imports (World Bank 1994:1, CASI 1999:15, Acharya 2002:1525).
improvement in economic performance, with GDP growth rising to 5.1 per cent in 1992-93, exports recovering, and industrial growth picking up (CASI 1999:3, EIU 2005a:32).

However, progress on economic reform was slowed by political uncertainty. Congress came under attack from its allies on the left, and was hit by a series of corruption scandals. The INC thus lost the 1996 election, which ushered in another period of unstable coalition governments (CASI 1999:15).

The Rise of the BJP

After three years of political instability, the impetus to continue with liberalization came from the Bharatiya Janata Party (BJP), a right-of-centre Hindu nationalist party. Originally coming to power in 1998, it convincingly won national elections as head of the National Democratic Alliance (NDA) in 1999. Once in power, the BJP moderated its communalistic appeals and adopted a more centrist social and economic platform – often against the wishes of its more fundamentalist members. The BJP continued with liberalization policies such as lowering tariffs and duties, and opened up a variety of new sectors to foreign investment – leading to a boom of high-tech industries and growing software, auto parts, and pharmaceuticals exports (CASI 2004:14-16).

The NDA enjoyed a solid majority in Parliament and lasted a full term, calling for elections in 2004. However, in spite of expectations to the contrary, the NDA lost to the Congress-led United Progressive Alliance. In difference to the past, Congress had set out to court alliances from a variety of state and regional parties. In particular, it was able to appeal to minorities and voters in rural areas, who felt left out of the country’s urban-based and middle-class economic boom (EIU 2005b:6).

---

This is not to say that the BJP did not pursue controversial policies, such as the testing of nuclear weapons in 1998. However, it did moderate its communalistic nature, giving up on pledges to build a Hindu temple in Ayodhya and abolish the country’s separate civil laws for Muslims (EIU 2005a:5).
The State and Liberalization

Regarding the state’s marked support for liberalization after 1991, Jenkins (1999), Kohli (2004a,b) and Rodrik and Subramaniam (2004) argue that pressure for liberalization had been accumulating since the 1970s. The crisis, rather than being a catalyst, was actually a pretext for the implementation of measures that deepened the pro-business drift that had begun a decade earlier.

This new pro-business orientation was underlain by an alliance between the state and established local industrialists. These industrialists received state support in return for improved economic performance. Measures in their interests, such as tax cuts and reduced regulation were implemented, but those policies deemed prejudicial (such as reducing tariffs) were contested and often dropped. The loosening of regulation, coupled with tariff protection, during the 1980s had allowed the business class to expand and gain confidence. This consolidation, in turn, meant that big business was more willing to accommodate the 1990s reforms. Thus, according to Kohli

India’s economic policies took on a more consistent character, generally tending in a more probusiness direction – a process dubbed by some observers as economic liberalization. During this phase the gap between governmental economic ambitions and capacities narrowed somewhat, not so much due to enhanced state capacities as to the scaling back of ambitions, but in the productive and redistributive spheres. Over the last two decades of the 20th century, India’s fragmented-multiclass state became not so much more cohesive as markedly less multi-class. (2004b:279)

This re-ordering of political goals resulted in the prioritisation of economic development above socialism or the eradication of poverty, hence moving the state in a more ‘developmental’ direction. However, while this pro-business drift has been consistent, it is not without its dangers – particularly in India’s political context. The 2004 elections, and the defeat of an incumbent administration that had overseen consistent economic growth showed very clearly that economic reform must be of benefit to wider groups of people than had been the case to date.
The Institutional Context

The trend toward liberalization after 1991 had implications for many aspects of India’s political and economic reality. In particular, the rolling back of the state’s regulatory regime and the emergence of new intermediate associations had far-reaching implications.

Centre-State Government Responsibilities

The 1950 Constitution had set the framework for central-state government relations. As mentioned, while state governments had a range of responsibilities, fiscal resources were heavily biased towards the central government. Furthermore, centralized planning, particularly under the Planning Commission, entailed pervasive central government intervention at the state level (Rao 2002:1). However, India’s federal framework was to substantially shape the liberalization process and, in turn, be shaped by it.

Jenkins contends that, prior to 1991, it was assumed that established interests like the agricultural sector, big business, or public sector employees enjoying the benefits of protection would uniformly oppose moves towards liberalization. This opposition, coupled with an increasingly weak state, would result in a stalemate. However, India’s ‘multi-level polity’ was to play a profound role in facilitating the liberalization process. Jenkins argues that India’s size and diversity, coupled with its various state governments was to fragment interest groups along regional lines. Thus, while many interest groups were against liberalization, they could not find over-arching themes around which to coalesce. The fragmentation of issues into regional segments created a multitude of winners and losers. Many states, which would traditionally have opposed liberalising measures, benefited in specific policy areas – making it hard for them to resist liberalization per se (1999:128-30).

The impetus toward liberalization was further strengthened when politicians in state governments realized the benefits that liberalization offered them. For example, the abolition of the industrial licensing system meant that entrepreneurs were now free to decide where to locate their firms and determine their production capacities – rather than
having them determined by the state. The repeal of this layer of control meant that state governments gained additional responsibilities (Jenkins 1999:134).

While the Constitution was not amended to reflect this new reality, the rolling back of central control ‘exposed’ the underlying regulatory structure at the state level, as state governments are charged with providing land, infrastructure, and monitoring environmental and labour standards. In addition, state governments have re-regulated some aspects of the policy framework, seeking to establish greater control over the economy or assert their own regional autonomy (Sinha 2004:30).

The relations between state governments have changed markedly in this new context. Prior to 1991, state governments competed with each other for a finite quantity of resources from the central government. Since 1991, they have begun to compete with each other to attract investment from a greater range of actors. In addition to courting foreign investment from large multinationals, state governments are now negotiating loans and financing directly with international financial institutions such as the World Bank (Rudolph and Rudolph 2001:1542, Sinha 2004:34).27

In this context, some states are moving more proactively than others to implement reform, invest in infrastructure, and court foreign investment. Bajpai and Sachs posit that southern and western states such as Andra Pradesh, Karnataka, Tamil Nadu, and Gujarat are ‘reform-oriented’ states. Haryana, Orissa, and West Bengal are ‘intermediate’ and the rest, which are largely rural and in the ‘Hindi Belt’, are ‘lagging’. The more reform-oriented states are attracting more investment and experiencing higher growth rates. This trend, while it constitutes an incentive for state governments to move proactively, also has negative implications for equity (Bajpai and Sachs 1999:2, Rao 2003:2).

26 In 1992 and 1993, the Constitution was amended to allow the creation of local-level governments. This does not affect centre-state government relations and the impact of these reforms has been limited due to resource constraints. Chhibber et al. (2004) find that, regardless of these reforms, most people still look to their state government for service provision.

27 In 1978, the public sector dominated the Indian economy, accounting for 80 per cent of all investment. Private investment amounted to 19 per cent and foreign investment one per cent. In 1998, the public sector accounted for 40 per cent of investment, the private sector 44 per cent, and foreign investment 16 per cent (Sinha 2004:29).
Furthermore, while state governments now have greater room for manoeuvre, they still rely on the central government for most of their revenue. Central government transfers have been declining and they have not been sufficiently linked to sound fiscal practices. Furthermore, state governments must also negotiate with their own interest groups which pressure them to resort to populist measures. Thus, some states have been better than others at managing their budgets. Bihar, Orissa, and West Bengal have registered deficits of up to nine per cent of their state domestic product, which also affects the central government’s fiscal health (Bagchi 2003:35, Rao 2002:15).

Therefore, India’s centre-state relations have moved in an opposite direction from Malaysia’s. While state governments are still reliant on transfers from the central government, the rolling back of central government responsibilities has entailed more autonomy and agency at the sub-national level.

**Modern Business Associations**

Up until 1991, business groups lobbied the government directly, or engaged in negotiations through the country’s two largest business associations – the Federation of Indian Chambers of Commerce and Industry (FICCI) and the Associated Chambers of Commerce and Industry (ASSOCHAM). Established in the 1920s and used to personalized lobbying, these associations represented established trading and manufacturing concerns (Kochanek 1996b:531).

However, the 1991 liberalisation measures fundamentally affected the relationship between the state and business groups. Relations became less particularistic and based on using personal influence to procure licenses and concessions. Rather, business needs became more general, embracing macro-economic and industry-wide issues. FICCI and ASSOCHAM were less suited to this style of lobbying, and came to be supplanted by other, newer associations (Kochanek 1996b:550).

One such association was the Confederation of Indian Industry (CII), which was to emerge as the collective voice of the manufacturing sector. The Confederation had highly
professional management, a decentralized structure, and a modern outlook. It raised formidable amounts of capital through a wide range of successful promotional activities, and invested them in hiring professional staff and compiling excellent industry-relevant information. These results, coupled with a modern, collaborative approach to government, enabled CII to successfully lobby for policy changes (Kochanek 1996a:167).

However, more than CII, the National Association of Software and Service Companies (NASSCOM) emerged as the voice of the software sector. The Association, established in 1988, was founded and led by small, independent software entrepreneurs. NASSCOM was initially comprised of 38 companies, and represented 65 per cent of the industry's revenues. Since then, its membership base has continually expanded, and it now has 900 members – accounting for 95 per cent of the sector's revenues (NASSCOM website).

The Association has emerged as the prime lobbying group for the software sector, both domestically and overseas. As with CII, its management has been professional and proactive. NASSCOM has moved aggressively to: compile a base of software companies; provide opportunities for networking and information sharing; combat software piracy; market the sector overseas; monitor market trends; and carry out industry-relevant research (Business Times 19/02/2001).

NASSCOM has also played a crucial role as an interface between the software industry and the government. In part, this was facilitated by good communication with bureaucrats at the DoE. In addition, NASSCOM has been diligent about cultivating close links with government, and creating forums and meetings for ideas to be interchanged (Pingle 2000:146). NASSCOM regularly works with the Ministries of Commerce, Finance, Labour and Human Resource Development, and has been proactive at the sub-national level, providing technical support to many state governments in the preparation of their IT strategies (NASSCOM website, Parthasarathy 2000:332).

---

28 Kapur's analysis of the top 100 Indian software firms revealed that less than 10% were associated with a large industrial conglomerate (2002:98).
In part, NASSCOM’s rise has been helped by the industry’s overwhelming export orientation. Because the majority of sector’s members do not concentrate on the domestic market and, thus, do not compete with each other, this has allowed an unusual degree of collaboration and collective action. Furthermore, the public goods that software entrepreneurs have sought are not ‘excludable’ or procurable through rent-seeking. Thus, NASSCOM has moved proactively to call attention to the quality of higher education, the shortage of infrastructure, and the need for better telecommunications (Pingle 2000:151-2). Due to its links with the government, it has been able to secure key tax concessions and reductions on import duties (Business Times 19/02/2001).

**Policies**

While moves towards liberalization had slowly been gathering momentum since 1980, the wide-ranging measures implemented in 1991 were the clearest manifestation of this trend.

The Rupee was devalued by 20 per cent, which helped promote exports and reduced imports. Monetary policy was tightened and moves made to reduce the fiscal deficit. Expensive subsidies, such as those on petrol were eliminated. The taxation system was reformed and simplified with taxes on key inputs being phased out and corporate and income tax rates lowered. The economy was opened up more to trade and investment. Quantitative restrictions on imports were eliminated and replaced by tariffs. In addition, tariff levels themselves were simplified and reduced from an average rate of 87 per cent in 1990-91 to 20 per cent in 2000. Restrictions on capital goods and intermediate imports were lifted and foreigners allowed to invest in the country’s capital markets (Acharya 2002:2897, EIU 2005a:32, CASI 1999:1).

The industrial licensing system was greatly reduced in scope and replaced by a system of automatic clearances for most sectors. While controls were retained for a number of strategic industries, the list decreased over time, falling from 18 in 1991 to seven in 1998. Similarly, restrictions on foreign equity in a wide range of industries were rolled back, and automatic approval of up to 51 per cent equity was granted for 34 industries. Thus, entire new sectors such as mining, heavy manufacturing, telecommunications, construction,
infrastructure, airlines, and defence equipment were opened to private and foreign investment. This also meant that aspects such as production levels, location, and technology transfer were taken out of the central government’s control (EIU 2005a:32, Sinha 2005:84).

While these reforms have continued since the early 1990s, there are still areas that are heavily regulated, and as mentioned above, there are areas that have been re-regulated by the different state governments. 31

**Electronics and Software Policies**

The macroeconomic and trade policies implemented after 1991 helped the growth of the software sector. Devaluation made software exports more competitive on the international market, and the abolition of quantitative restrictions and lowering of tariffs allowed more computers to be imported, thus helping the demand for software.

However, the software policy framework did not change markedly during this period, as the most important liberalizing measures had already been implemented. Rather, policies continued to reduce controls on the sector and to promote more exports. Thus, profits on the export of software services were made exempt from income tax in 1992, and duties on software and hardware imports were gradually reduced until they were completely eliminated (Parthasarathy 2000:330).

However, the Department of Electronics, and, by proxy, the central government, continued with its more proactive, promotional role. 32 By the late 1990s, at least 25 Software Technology Parks had been established, although not all were owned by the DoE. It further encouraged the setting up of institutes to meet the demand for specialised manpower, such

---

31 Thus, there has been little movement on the ‘exit policy’, which restricts firms with more than 100 workers from downsizing staff. Firms still need to apply to state governments for redundancy measures, which are rarely given. Furthermore, there has been relatively little progress with privatising the more than 260 central government and 800 state government-owned enterprises. Tariff levels continue to be high and the consumer goods sector is still protected from international market forces. Furthermore, heavy industry is still dominated by the public sector, and many SMEs are still protected from competition (Nayar 1998:336, Jha 2002:182).

32 In 1999, the Department of Electronics was restructured and renamed the Ministry of Communication and Information Technology. It now consists of two departments, one looking at IT and the other looking at telecommunications (Lema and Hesbjerg 2003:57, Frontline 11/12/1999).
as the Indian Institutes of Information Technology and Software Engineering Institutes. The DoE also lobbied the Central Government to require all government departments to spend 1-3 per cent of their budgets on information technology, thus increasing the local demand for software products and services.

In 1998, the National Taskforce on Information Technology and Software Development was created, with representatives from government, industry, and academia. The Taskforce has been useful in exchanging information, recommending legislation, and setting export targets. To date, the Taskforce’s collaborative approach to policy-making has been fruitful if somewhat wide-ranging. It set an export target of US$ 50 billion by 2008, and has compiled a list of more than 100 policy recommendations to facilitate this (Saxenian 2002:181).

To summarize, during this period, the state moved to lift the regulatory burden on private sector firms through reducing equity restrictions and the industrial licensing regime. The software sector, for its part, had already been de-regulated. Thus, the state continued to provide specialised infrastructure, moved to ensure an adequate supply of manpower, and institutionalised a means of communication with software entrepreneurs.

Outcomes

Over the period 1991-2003, the economy grew at an average of 5.6 per cent p.a., compared to 5.9 per cent during 1980-1990. As Diagram 7.3 shows, per capita income also grew consistently, climbing from US$ 300 in 1990 to more than US$ 500 in 2003. However, seen from a longer-term perspective, the 1990s are a continuation of the trend established in the 1980s.

During the 1990s, external trade also increased markedly, climbing from 15 per cent of GDP in 1990 to 30 percent in 2003 (Diagram 7.4.). Seen from a long-term perspective, trade as a percentage of GDP has grown consistently, only levelling off during the 1980s – lending credence to the argument that economic growth during this period was a result of internal liberalization measures.
As a result of these policy measures, foreign direct investment began to flow into India. After 1991, foreign direct investment increased for seven straight years, reaching almost 0.9 per cent of GDP in 1997. After falling to about 0.5 per cent of GDP in 1999, FDI flows rose again, staying above 0.7 per cent after 2000.  

With respect to software, the sector has grown more than 50 per cent per year since 1993. India now has more than 7,400 software companies and the IT and ITES sectors employ more than one million workers. The sector generated more than US$ 12 billion in 2003/04, and captured more than 44 per cent of the global offshore outsourcing market (Lema and Hesbjerg 2003:84, NASSCOM website).
However, it must be remembered that liberalization and greater trade levels have both positive and negative effects. On one hand, lower barriers to the international economy entail exposing local producers to technology and industry best practice. However, on the other, there is a risk that local producers will be overwhelmed.

In addition, while India’s growth has been consistent and rapid, it started from a low base. India’s exports represent some 15 per cent of GDP, compared to China’s 33 per cent and Korea’s 38 per cent. While India received US$ 4.3 billion of FDI in 2003, this paled in comparison to China’s US$ 53.5 billion (Hew 2006:263). Conversely, India may claim to have a more conducive environment to local entrepreneurship. Forbes’ list of the world’s most innovative SMEs had 13 Indian companies in the software, pharmaceutical, and biotech sectors, but only four Chinese firms (The Hindu 03/08/2003).

**Summing Up**

This section has argued that, rather than constituting a radical break with the past, the 1991 entailed a deeper and more productive alliance with the private sector. The rolling back of
the regulatory burden the previous decade was complemented by gradual lowering of barriers to the international market. While the communication between the state and private sector did not approximate the embedded and autonomous ideal, it was helped by the emergence of modern business associations. The explicit prioritisation of economic concerns, as opposed to various and competing goals, was rewarded by increased growth and exports.

Regarding software, the sector had already been liberalized, but the more open environment, availability of foreign capital, and easier access to technology was of great benefit to the sector. The sector was also helped by promotional measures such as the construction of technology parks, greater local demand by government, and the creation of specialized educational institutions. While the Department of Electronics still served as a liaison between the state and private sector, this function came to be more effectively performed by NASSCOM.

Conclusions

This chapter has sought to understand how the Indian state and its industrial policy framework have influenced the country’s drive for economic transformation. In doing so, it has looked at India’s recent history, paying attention to the state bureaucracy, its capabilities, and ties with the private sector. It has also looked at the nature and impact of the country’s industrial policy framework, as well as the evolution of centre-state government relations.

Regarding the state, its capabilities, and ties with the private sector, this chapter has argued that, at independence, India’s political and institutional context was conducive to the emergence of a developmental state. The Indian National Congress had uncontested legitimacy, the bureaucracy was coherent and capable, and there was broad agreement on the need for state intervention to foster rapid and ‘self-reliant’ industrialization.

However, India did not create its institutions on a blank slate and had to contend with established and powerful interests. In spite of the legitimacy of state intervention, existing business concerns were able to subvert attempts to monitor private sector operations. Thus, the Planning Commission, which was intended to coordinate the country’s industrialization drive, was hampered by rivalry between different state agencies and its inability to set performance standards for firms. State-owned enterprises were constrained by the social functions they had to perform, and private sector firms were channelled into undemanding and consumer-oriented sectors with little incentive to upgrade or export.

In addition, as with Malaysia, economic growth and transformation was only one goal among several. The Indian state was also committed to democracy, poverty reduction, and socialism, which all competed for state attention and resources. Furthermore, the state’s institutional capacity declined considerably after independence – away from the ‘developmental ideal’. The state bureaucracy, once the ‘iron cage’ of the country, lost considerable institutional capacity and lapsed into rent-seeking with elements of the private sector.

Notwithstanding this context, the Department of Electronics emerged as a ‘pocket of efficiency’. Its technocratic composition, institutional autonomy, good communication with entrepreneurs, and relative freedom from rent-seeking meant that the DoE was able to perceive the sector’s policy needs. As a result, the DoE moved away from promoting a national champion towards fostering local businesses in an incredibly short time.

After economic stagnation in the 1970s, the Indian state became markedly more pro-business and its industrial policy framework evolved accordingly. While public commitments to socialism and poverty reduction were kept, the state entered into a de facto alliance with large business concerns and economic growth was privileged above other considerations. Thus, a raft of measures to remove the regulatory burden on local firms was enacted but tariff barriers were kept, thus allowing local businesses to grow and consolidate without international competition.

This pro-business drift was further deepened after 1991, when the state moved aggressively to liberalize key sectors of the economy. This open national context further favoured the
development of the software sector, through allowing foreign capital and expertise to flow in and making key inputs more accessible. The state’s promotional role in providing key infrastructure, human resources, and encouraging exports further helped the growth of the software sector.

As part of the reform process, India reduced central government control at the sub-national level. The new de-regulated framework dramatically increased the room for manoeuvre at the state level, as it uncovered existing state level regulatory mechanisms and encouraged provincial governments to compete with one another to attract investment from the domestic and international private sector.

Having looked at the country’s political and institutional context, the next chapter will go on to look at the case of Karnataka. It will seek to establish why this state, as opposed to others, emerged as the leading centre for the software sector and what role, if any, the Karnataka State Government played in fostering its emergence and subsequent development.
CHAPTER 8

The Karnataka Case Study

Introduction

Chapter Six looked at the software sector in Karnataka, setting out its strengths and weaknesses, and comparing it to other software-producing states in India. The argument put forward is that Karnataka — particularly its capital, Bangalore — has emerged as the country’s most dynamic centre for software development. However, while the province’s IT sector has grown very quickly it has yet to fully attain economic transformation. That said, given the industry’s insatiable demand for labour and unexploited market segments, Karnataka’s software sector has a window of opportunity to move further up the value chain.

In seeking to understand the development of Karnataka’s software sector, Chapter Seven drew on available secondary material to analyse India’s central state apparatus and national industrial policy. It argued that the country’s overall lacklustre economic performance on one hand, and impressive development of the software sector on the other, are partly explained by the structure and composition of national-level state institutions as well as its policy framework. In addition, it argued that the 1991 reforms opened the way for greater initiative at the sub-national level.

However, while useful, this is only part of the story, as it does not explain why the software sector has developed more successfully in Karnataka than elsewhere in India. Thus, as with the Penang case study, through bringing together a wide range of material including extensive primary data, this chapter will provide the first analysis of how Karnataka’s political, institutional, and policy context influenced the evolution of its software sector.

To this end, this chapter will be divided into six sections. The first two sections will provide brief summations of developments in Karnataka leading up to, and immediately after, independence. The next three sections will each explore a period in the province’s recent history. As in previous chapters, a Historical Institutional approach will be used to
analyse each era’s political and institutional environment before analysing the respective policy choices and outcomes. The last section will summarize and put forward the chapter’s main conclusions. Reference will be made to the Penang case study throughout this chapter in order to highlight key similarities and differences.

**Pre-independence**

The Princely State of Mysore, as Karnataka was formerly named, was conquered by the British East India Company in 1799. After a period of direct rule over the state, the British reverted to indirect rule in 1881, bequeathing formal authority to Mysore’s traditional rulers, the Wodeyars, but retaining the right to intervene (Kaul 1993:58-59).

The Wodeyars, while a noble family, did not have ties to the state’s dominant caste groups. In order to garner support, they came to an agreement with these land-owning castes, which entailed ceding *de facto* control over rural areas in return for regular tax contributions (Manor 1977:9-11). This regular supply of income, coupled with good administration, allowed the state to implement a variety of progressive policies. Thus, Mysore was the first state to establish a legislative assembly, install electricity, and develop an extensive railway system (Manor 1975:36, Pani 1998:68).

Under the rule of two visionary Chief Ministers, Mysore began an ambitious industrialization drive. The first, Visvesvaraya (1912-18), promoted education, heavy industry, and rural development, establishing an array of institutions and state-owned enterprises. The second, Ismail (1926-41), built on these achievements, encouraging joint projects with the private sector and developing a range of heavy industries.

---

1 The province’s name was changed to Karnataka in 1973.

2 To this end, key institutions were established, including: the Bank of Mysore, the Department of Industries and Commerce, the Mysore Chamber of Commerce, Mysore University, and the Mysore Economic Conference. Visvesvaraya also set up state-owned enterprises to make iron and steel, soap, and sandalwood products (Hettne 1978:257, 262-64, Vyasulu 1989:1702).

3 Ismail promoted the development of a modern sugar industry through: loans, technical support, creating an irrigation system, and establishing a processing plant. Through the Department of Industries and Commerce, enterprises producing steel, iron, cement, paper, and fertilizer were set up. Technical support and financial assistance were given to a variety of light manufacturing and processing concerns – many of which were inter-linked.
these policies, the cities of Bangalore and Mysore came to house relatively developed industrial sectors.\textsuperscript{4}

However, in spite of the Wodeyars' progressive policies, they were not willing to share power with the state's emerging political elites. Popular support for democracy and greater public political representation was overwhelming, and following massive civil disobedience after independence, the Wodeyars transferred their authority to the Congress party (Manor 1977:160-62).

Entrenched Conservatism (1947-1972)

As with Penang, Mysore entered the post-independence era with a defined economic model that was at odds with its neighbours and the central government. However, unlike Penang, Karnataka benefited from central government support, even as its state-level institutions became captive to landed interests.

Mysore in Independent India

Mysore's good institutions, developed physical infrastructure, and high-end research and educational establishments provided a platform for Bangalore's growth after independence. Its dust-free climate and distance from borders with Pakistan and China also made it an ideal site for the country's scientific and military research institutions. In addition, India's leaders envisioned Bangalore as the country's intellectual capital (Heitzman 2004:45, Stremlau 1996:50).

Thus, during the 1950s and 1960s, the central government, as part of the drive to develop capabilities in 'strategic sectors', located key industrial and military institutions in the city.\textsuperscript{5}

\textsuperscript{4} Furthermore, Bangalore's leading industrial position was bolstered in the 1940s by the establishment of the Hindustan Aircraft Ltd (HAL) company and the Indian Academy of Sciences, with support from the Government of India. The Government of Mysore, in turn, established SOEs to manufacture radio and electrical equipment (Heitzman 2004:39-40).
These institutions, in turn, generated demand for highly educated workers and a tier of subcontracting firms (Heitzman 1999:2, Parthasarathy 2004c:18).

Central and state government institutions proliferated in India’s planned economy. By the mid-1960s, Bangalore had 62 state government departments and 297 offices, as well as more than 80 central government institutions. By 1970, the city had more than 50,000 people working for different public agencies (Heitzman 2003:59, 2004:45-55).6

However, Mysore’s status as a state in the federation was not unproblematic, as it entailed some loss of autonomy for the state government, who had little input into national plans (Thimmaiah 2005:8-10). Furthermore, local elites perceived that the central government’s interest in Mysore was limited to Bangalore, with few investments in other parts of the state (Hettne 1978:339-49).

**The Dominant Castes**

At the state level, the ruling Congress party was appropriated by the state’s dominant castes. These groups, the Lingayats and Vokkaligas, comprised about 30 per cent of the state’s population and controlled large voter banks. After independence, these groups were able to gain control of relevant governmental institutions – securing every Chief Ministership until 1972 (Thimmaiah and Aziz 1983:814).

These caste groups gave subsequent administrations a conservative bent, as they sought to focus investment on subsidies for irrigation, electricity, and agricultural inputs – resisting anything resembling a tax on agricultural income. Thus, comparatively few state government resources were invested in industrialization (Pani 1998:72-73, Thimmaiah 2005:10).

---

5 These included: Bharat Electronics of the Ministry of Defence; Hindustan Machine Tools of the Ministry of Heavy Industry; Indian Telephone Industries; the National Aerospace Laboratories; and the Indian Space Research Organization’s Satellite Centre.

6 Bangalore, as the state capital, received a further boost with the linguistic reorganization of states in 1956. Mysore essentially doubled in size, absorbing the Kannada-speaking areas of Maharashtra, Andra Pradesh, and Tamil Nadu. However, this was not without its complications, as these areas were, in their majority, rural and poor (Hettne 1978:335).
Industrialization

Due to the separation of powers between the central and state governments, the Government of Mysore’s ability to foster industrialization was limited. Decisions regarding the location of large public sector enterprises and private sector firms lay with the central government, meaning that state-level industrial policy was restricted to providing investment incentives, setting up infrastructure, fostering local SMEs, and establishing the occasional public enterprise (Sinha 2004:28, Inoue 1992:117).

In spite of this, the Government of Mysore implemented some policies to encourage industrial development. During the late 1950s and 1960s, it established institutions to provide financing, promote SME development, and develop land sites and infrastructure. In 1968, the state government developed a basic industrial policy with investment incentives including subsidies for feasibility studies, electricity and sales tax concessions, and preferential purchasing (Government of Karnataka 1966:1-10, Inoue 1992:118-9, Gayithri 2003:176).

However, Mysore began to lose its position relative to other states. While it had been, at independence a leading industrial state, along with Maharashtra, Gujarat, and Tamil Nadu, Mysore was overtaken by other, more dynamic competitors during the 1960s and 1970s (Upendranadh et al. 1994:M157-58).

Education Policy

Despite their conservative bent, the dominance of the Lingayats and Vokkaligas was to result in an important policy innovation. Notwithstanding their political power, these caste groups had been unable to access government posts, as the Brahmins, a numerically small but urban-based caste group, had come to dominate the public sector. Perceiving that
further education was the key to these posts, the Lingayats and Vokkaligas lobbied the state government to set quotas on college seats for rural-based and ‘backward’ castes.7

Following the implementation of this policy, Brahmins began to establish private colleges to cater to their unmet demand for further education. Perceiving the long-term potential for social mobility, other caste groups, including the Lingayats and Vokkaligas, soon followed suit and established their own colleges.

The higher education sector subsequently grew very quickly, with 78 private colleges established from 1951-66. For more than three decades, Mysore had the biggest and most vibrant private higher education sector in the country. This was key for enabling the state to develop its human resource base, in turn helping it to cater to its growing group of educational and scientific establishments (Kaul 1993:242, Wood 1972:86).8

**Summing Up**

Therefore, from independence until the early 1970s, Mysore remained under the control of the landed elite. Unlike Penang, where the state government took an active role in fostering industrial growth, in Mysore the state government remained beholden to rural elite interests. However, unlike Penang, Mysore’s educational institutions, good infrastructure, and strategic location dovetailed with national priorities for self-sufficiency and industrial development - resulting in capital-intensive investments by the central government. Bangalore thus began to acquire a core of technology-intensive firms as well as a small group of supporting firms and a thick labour market. In addition, the state developed a rudimentary institutional structure to oversee economic development, and the liberalization of higher education dramatically boosted the state’s skill base.

---

7 Although they comprised only three per cent of Karnataka’s population in 1945, Brahmins made up 60 per cent of the college population (Wood 1972:87).

8 Interview with Jawaid Akhtar, Director, Department of Biotechnology and Information Technology, Government of Karnataka, Bangalore (30/06/2004).
Consensual Administration? (1972-1989)

As in Penang, the political environment changed markedly during this period. In Karnataka’s case, the dominant castes’ hold on power was broken and hitherto marginalized groups were mobilized. In contrast, however, to Penang’s solid institutions and well-articulated drive for development, in Karnataka, the integrity of state institutions declined as rent-seeking became more frequent. While the state government invested energy in developing its industrial sector, a small but dynamic software cluster emerged separately.

The Political Context

The Karnataka branch of Congress, dominated by Lingayats and Vokkaligas, had sided with the traditional ‘party bosses’ against Mrs. Gandhi in the late 1960s. Following her victory, Mrs. Gandhi proceeded to centralize power, directly appointing Chief Ministers in Congress-led states. Thus, in 1972, she appointed Devraj Urs, a member of a small and relatively powerless caste group, as Chief Minister of Karnataka.

Urs was initially dependent upon Mrs. Gandhi for legitimacy, but built his own power base through appealing to intermediate and lower-caste Hindus, Muslims, the poor, and urban workers (Kohli 1982:310-11, Pani 1998:74). To this end, Urs implemented an array of progressive policies, including: a housing program, credit initiatives, a pension plan, and an expansion of the education system (Nataraj and Nataraj 1982:1505, Srinivas and Panini 1984:71). 9

This able local-level political manoeuvring, coupled with effective fund-raising for the national Congress leadership, helped Urs remain in power until 1980. During this time, he had a profound impact on Karnataka’s political context, mobilizing the political power of

---

9 Following his election victory in 1974, Urs then implemented an ambitious land reform program and a quota system, which reserved a set number of school seats and public sector jobs for ‘backward classes’. He successfully divided the dominant castes by including one group (the Vokkaligas) in the program and excluding the other (the Lingayats). However, in order to avoid a backlash, Urs ensured that political patronage and benefits accrued to all caste group leaders (Nataraj and Nataraj 1982:1505).
hitherto marginalised groups, and promoting a more inclusive style of leadership (Srinivas and Panini 1984:73, EPW 20/01/1990).

Following a falling out with Mrs. Gandhi, Urs contested the 1980 state elections as head of his own party. He was unable to convert his popularity and legitimacy into electoral support, thus losing the election to the Congress candidate, Gundu Rao (Nataraj 1980:55).

The Rao administration was characterized by the excessive personalization of power, high levels of corruption, and bureaucratic inefficiency. As with many Chief Ministers in Congress-led states, Rao owed his appointment to Mrs. Gandhi. His loyalty and procurement of funds won him her support but did not enable him to win the 1983 state elections – marking the first Congress defeat in Karnataka (Nataraj 1983:139, Manor 1984:143-45).

The competing party, Janata Dal, initially drew its support base from dominant caste groups, but had to widen its appeal to be politically viable. Once in power, it acted quickly to gain legitimacy and build a grass-roots party organization. Janata Dal invested considerable resources in rural areas, but after a promising beginning, was paralysed by factional infighting, ultimately losing to Congress in the 1989 elections (Nair 1987:122, EPW 15/10/1993).

The Institutional Context

The Government of Karnataka

While Karnataka’s political context changed for the better during this period, other less positive institutional changes also took place. Most notably, the integrity of state government institutions was compromised as rent-seeking increased markedly and bureaucratic autonomy eroded.

At independence and shortly thereafter, the Government of Mysore and its successor, the Government of Karnataka (GoK), were held in high esteem – due to their efficient administration and progressive policy-making (Hettne 1978:335, Vyasulu 1995:2635).
However, during the 1970s, under Mrs. Gandhi, the integrity of federal and state-level institutions was compromised. Her personalistic and authoritarian personal style, coupled with demands for 'black money', led to the selection of mediocre state leaders and pervasive rent-seeking.

In spite of Urs’ progressive policy regime, his tenure was also characterised by pervasive corruption. In large part, these funds were procured for the Congress high command. Urs’ effective fund-raising, coupled with Karnataka’s distance from New Delhi, allowed him considerable autonomy, which could then be used to implement policies to broaden his base of support (Manor 1989:355).

The level of corruption worsened under the Rao administration. Rao had no ambitions of effective policy-making, retaining all major spending portfolios for himself. The desire to create new fund-raising mechanisms, coupled with the inability to closely supervise the workings of government, resulted in ever-increasing levels of rent-seeking (Manor 1984:144).

The advent of Rajiv Gandhi meant that the demands from Delhi for campaign funds were scaled back. In addition, the Janata Dal victory at the state level meant that local networks of corruption were disrupted. However, the institutional deterioration had affected the prestige of state government institutions, and during the 1980s many bureaucrats left the public service to seek opportunities in the growing private sector.10

Policies

Central Government Policies

During the 1970s and 1980s, the central government continued to favour Bangalore as a centre for education and research. Elite institutions such as an Indian Institute of Management, the Aeronautical Development Agency, and the Centre for Mathematical

10 Interview with Deepak Kumar, Deputy Editor, ‘Software Dioxide’ magazine, Bangalore (22/06/04). However, this institutional decline was relative. While the integrity of state government institutions had been compromised, GoK institutions were still considerably better and more professional than those in most other states in India, notably those in the North (Manor 2005:16,19).
Modelling and Computer Simulation were set up in Bangalore. As with their predecessors, these institutions generated a demand for skilled workers and supporting firms, many staffed by former public sector employees (Heitzman 1999:13, Lema and Hesbjerg 2003:62).

However, as regards software, the central government originally favoured Mumbai as the centre of the nascent sector, due to its status as the leading city for finance, banking, and manufacturing. Thus, in 1973, the Department of Electronics (DoE) established the Santa Cruz Export Zone in Mumbai which, in addition to specialized infrastructure, offered an array of incentives to attract local and foreign investment.

This preference was to change during the 1980s, as the country’s de-regulating environment saw a number of software clusters emerge in major cities like Bangalore, Chennai, New Delhi, and Hyderabad. In particular, the 1984 and 1986 Computer Policies helped through liberalizing imports, exports, and access to technology.

In the late 1980s, the Department of Electronics began to help Karnataka’s software sector directly. On one hand, it began to locate key R&D centres in the city, like branches of the National Centre for Software Technology and the Centre for the Development of Advanced Computing (Frontline 11/12/1999). On the other, it played a key role in negotiating with potential investors like Texas Instruments and Hewlett Packard to set up facilities in the city.

**State Government Policies**

During the 1970s and 1980s, the GoK implemented measures to create small enterprises and encourage the dispersal of firms to rural areas. This included assistance with feasibility studies and tax exemptions as well as incentives for firms to move to rural areas. These policies were somewhat successful at creating new SMEs and encouraging smaller firms to relocate, but their success with larger firms was limited, due to the lack of supporting infrastructure outside Bangalore (Inoue 1992:120-24).
The GoK also established institutions for urban planning and investor liaison. Thus, the state government created the Bangalore Development Agency to manage land development in the city and the Karnataka Udyog Mitra, an investor liaison agency tasked with facilitating investment and overseeing the provision of incentives (Heitzman 2003:60).11

In 1977, the GoK set up a state-owned enterprise, KEONICS12, to produce high-end electronics components. While the enterprise was not commercially successful, it implemented several important measures. Most notably, in 1985, it set up a specialized park, Electronics City, for the IT sector, which offered investors steady provision of electricity, specialized telecommunications infrastructure, a training centre, and tax incentives (Lateef 1997:25).13

While the state government tried to facilitate the emergence of modern industries, it faced serious problems insofar as infrastructure was concerned. As mentioned, medium to large firms were loath to relocate outside urban areas for this reason. Furthermore, despite Karnataka's developed electricity sector, insufficient investment resulted in severe power shortages by the 1980s, causing many firms to run below capacity and affecting further investment (Inoue 1992:128, Pani 1998:76).

The exception to this rather mediocre panorama was the private higher education sector, which, spurred on by available public sector jobs and spiralling parental ambitions, burgeoned. In particular, the number of private engineering colleges grew rapidly during the 1980s.14 By 1988, Karnataka had almost 20 per cent of the country's engineering colleges, all but one of which were privately-owned (Kaul 1993:84).15

Furthermore, due to Karnataka's banking tradition, the state had a comparatively well-developed financial sector, with a variety of local banks. In addition, due to the state's

---

11 Interview with Gurunath Kulkarni, Managing Director, Karnataka Udyog Mitra, Bangalore (22/06/2004).
12 Karnataka State Electronics Development Corporation Limited.
13 Interview with Balaji Parthasarathy, Assistant Professor, Indian Institute of Information Technology Bangalore (IIIT-B), Bangalore (08/06/2004).
14 Interview with A.S. Seetharamu, Professor, Education Unit, Institute of Social and Economic Change, Bangalore (08/07/2004).
15 Interview with Vivek Kulkarni, former Director of IT and Biotech, Government of Karnataka, Bangalore (01/07/2004).

**Outcomes**

During the 1980s, Karnataka’s economy grew at an average 5.6 per cent per year, on par with the country’s overall growth rate (Joseph 2004:4). The province now had a core of medium and large industrial firms, constituting a source of demand for skilled labour and downstream firms.

However, due to insufficient investment, the quality of Karnataka’s infrastructure declined relative to other states. This, coupled with the central government’s policy of reducing regional disparities, meant that Karnataka’s industrial sector began to fall behind. While Karnataka had been among the four leading industrial states at independence, by the mid-1980s, it was 8\textsuperscript{th} or 9\textsuperscript{th} (Upendranadh et al. 1994:M157-58).

At this time, the software sector was not yet a priority area for policies or investment. Regardless of this, by the end of the 1980s, Bangalore had a small cluster of software firms. This was due to several reasons.

First, the city’s large number of over-staffed public sector enterprises provided a stock of potential entrepreneurs and a diversified client base for the software sector.\textsuperscript{17} Thus, a number of mid-level employees established their own software firms to cater to the many R&D and academic institutions (Van Dijk 2003:95, Vijayabaskar and Krishnaswamy 2004:184).

In addition, Bangalore also benefited from other regions’ diseconomies of scale. Due to pollution, spiralling real estate prices, and skill shortages, entrepreneurs left Mumbai,

\textsuperscript{16} Technical Development and Investment Corporation of India.

\textsuperscript{17} Unlike most other sectors in the Indian economy, the IT sector is not dominated by large business houses (Athreye 2003:39). TCS and Wipro provide the most notable exceptions to this rule.
seeking to capitalize on Bangalore’s ready stocks of engineers, cheaper real estate, less congested roads, and potentially more plentiful electricity (Heeks 1998:13).

Furthermore, Bangalore was given a boost relative to its competitors with the arrival of two international industry leaders. In 1986, Texas Instruments chose to set up a development centre in Bangalore due to the city’s large number of skilled workers, cluster of research institutions, and supplier base (Heitzman 1999:10).

This was fortuitous, as the GoK had no involvement in negotiations. The Department of Electronics played a facilitating role – even breaking regulations to facilitate the process. In addition, the DoE negotiated for TI’s satellite link to be made available to local firms to export their data. This, in turn, encouraged firms from other states to relocate to Bangalore in order to serve offshore clients. In 1989, following TI’s lead, Hewlett Packard set up a subsidiary in Bangalore, providing another large potential client for Bangalore-based firms (Evans 1992a:7, Lateef 1997:9,21, Vijayabaskar and Krishnaswamy 2004:184).

Up until 1986, Mumbai was the industry’s undisputed centre. However, the more liberalized economic climate, coupled with Mumbai’s diseconomies of scale opened up a ‘window of locational opportunity’ to a group of cities with the requisite electrical and infrastructural facilities. Thus, Bangalore, along with Delhi, emerged as serious rivals. By 1990, Bangalore had a cluster of some 26 firms, relative to Mumbai’s 36, and Delhi’s 34 (Parthasarathy 2000:352). In particular, the city housed the headquarters of domestic firms such as Infosys and Wipro, who would emerge as industry leaders over the next decade.

While the emerging software cluster was a good portent, Karnataka still faced many challenges. Whereas the state’s more democratic context bode well for its political stability and commercial environment, it was still a predominantly rural economy characterised by poverty. Even in urban areas, most workers were part of the informal economy, either self-employed or working in the textile sector. In 1971, this included 50-60 per cent of the urban workforce, rising to 65-70 per cent in 1991 (Heitzman 2001:5).

---

18 Interview with Deepak Kumar.
Furthermore, Bangalore began to expand quickly, outstripping the capacity of planning agencies and manifesting diseconomies of scale. Between 1951 and 1981, Bangalore’s population grew four-fold from 780,000 to 2,900,000, making it the fifth-largest and most rapidly growing city (Heitzman 2004:52-55).

**Summing Up**

The 1970s was an important decade for Karnataka’s political structure. The state’s dominant castes’ hold on power was broken and its poor and low-caste majority mobilized, leading to a more consensual and inclusive style of government. In addition, Congress’ loss and the rise of Janata Dal ended Karnataka’s de facto one party rule, opening the way for a more responsive style of governance. But, unlike in Penang, while these changes heralded a more open political environment, they did not result in a compact between the state and local or international elites to promote economic development. Indeed, the quality of state-level institutions declined significantly, and frequent changes in government made concerted action more difficult.

Policy shifted away from privileging the interests of rural elites, towards more inclusive policies stressing the creation of small and medium enterprises and the reduction of regional disparities. However, unlike Penang, where the state leadership clearly prioritized the electronics sector, the GoK’s did not specifically target the software sector.

Notwithstanding this, by the end of the decade, Bangalore had a small group of software firms and key investments from industry majors – threatening to unseat Mumbai as the nation’s leading software centre. In addition, unlike Penang, Karnataka enjoyed central government investments in key research and development facilities, which entailed a demand for high-end manpower and subcontracting firms. These policies were encouraged by Karnataka’s ‘created asset’, namely its rapidly-expanding higher education system. This core of skilled workers and research institutions, coupled with low real estate prices and little pollution, attracted a group of domestic and international software firms and enabled more to emerge locally.
Thus, while there was no compact or alliance between the GoK and local software entrepreneurs, the state’s ‘enabling environment’, along with its skill base and comparatively insignificant diseconomies of scale, lay the foundation for the sector’s subsequent growth.

**Take-Off (1989-1999)**

Unlike with the birth of the electronics sector in Penang, the take-off of the software sector was not accompanied by a consistent policy direction from the Government of Karnataka, but rather struggles for power among different groups. In spite of this, the GoK continued with its tradition of incremental policy-making, gradually coming to recognize the importance of the software sector – which had gone from being a niche sector to a major employer with considerable political clout. However, in spite of more business-friendly policies, the relationship between the state and software sector did not reach ‘developmental’ dimensions.

**The Political Context**

Due to Janata’s paralysis, Congress won the state elections resoundingly – partly on its promises of greater stability and more concerted action than the incumbents. Notwithstanding this, the following Congress term was marked by frequent internal squabbles, changes of leadership, and increasing corruption (Pinto 1994:3309).

The first Chief Minister, V. Patil, due to his Lingayat background and inaccessibility to voters, lost support among key constituencies during his tenure – including the national Congress leadership (EPW 13/10/1990). His successor, S. Bangarappa, was highly corrupt, allowing patronage networks to proliferate to the detriment of state government institutions and policies. Tardy intervention from the national Congress leadership led to his replacement by a third Chief Minister, Veerappa Moily (EPW 17/08/1991, 29/08/1992).
Moily was able to retain the support of key Congress figures and substantially curb corruption in state-level institutions, but was unable to unite the local Congress branch under his rule. Moily had to resort to an expensive mechanism of power-sharing, constructing a bloated cabinet to offer posts to all caste group leaders. Notwithstanding this, Moily alienated key constituencies by introducing a controversial quota system and mishandling Karnataka’s linguistic issues (Pinto 1993:1786-87, EPW 16/04/1994, 14/01/1995).

Thus, Congress, during its term in power, did not address the important issues confronting India and Karnataka – namely the country’s sweeping liberalization programme. This, in turn, paved the way for a Janata party victory in 1994.

The Janata administration, under Deve Gowda, was more effective at constructing consensus and addressing economic issues. Gowda introduced land reform measures, a new agricultural policy, and emphasized attracting foreign investment (Nair 1996:1380). Under him, the GoK began to pursue liberalization with more vigour, seeking to privatize unprofitable state-owned enterprises and pay more attention to the state’s fiscal health (Frontline 15/12/1995).

Deve Gowda became Prime Minister of India at the head of a Janata Dal-led coalition in 1996. J.H. Patel took over as Chief Minister of Karnataka and sought to maintain the policy directions established by his predecessor (Frontline 28/06/1996). Gowda returned to Karnataka in 1997, following the coalition’s disintegration. Tensions soon arose between the two leaders, leading to eventual paralysis in policymaking (EPW 06/03/1999, 17/07/1999). And, regardless of Janata’s greater responsiveness, an increase of communal tension across India buoyed support for Congress in the 1999 elections.19

Thus, during this period, Karnataka’s political debate was not overly concerned with economic fundamentals or the state’s commercial environment, but rather power-sharing

---

19 The Janata party had entered into an alliance with the BJP, the Hindu nationalist party. At the local level this favoured Congress, traditionally seen as a more multi-cultural and inclusive party. Thus, Congress made more headway among Muslims, lower caste Hindus, and Christians. Furthermore, it successfully split the dominant caste vote block through fielding a candidate, S.M. Krishna, from one of these groups (Assadi 1999:3164-65).
between different groups. However, Karnataka’s tradition of inclusive, consensual coalitions enabled comparatively steady, incremental policy-making, with relatively few dramatic changes in direction. And, given the efficient working of party politics, unpopular Chief Ministers did not last long (Manor 2005:25).

The Institutional Context

Central Government Institutions

Software Technology Parks of India (STPI)

Notwithstanding the withdrawal of the central government from many spheres of the economy after 1991, it remained committed to fostering the growth of the software sector. While the software policies implemented during the 1980s lessened state oversight of the economy, the central government and the DoE moved to actively support the software sector during the 1990s.

As mentioned, the DoE started building software technology parks – which were the industry’s equivalent of export processing zones – across the country. These parks offered preferential provision of water and electricity, cheap land, and access to satellites for offshore work. The STPIs also provided streamlined procedures for starting operations and importing equipment, as projects under a threshold of US$ 2.4 million could have all central government permits issued within hours. Investors were also offered important tax concessions and firms could be foreign-owned and repatriate capital easily (Parthasarathy 2000:330, Lema and Hesbjerg 2003:68, STPI-B website

In addition to addressing the infrastructural issues facing software entrepreneurs, the STPIs enabled the Indian software industry to make the transition from low-end on-site work to more sophisticated offshore contracts through allowing local firms to service customers overseas. Furthermore, STPIs dramatically lowered the transaction costs for starting a new

---

20 'Policymaking in India is very difficult, as you need to provide a lot of things for a lot of different people'. Interview with D.B. Inamdar, Minister of Information Technology and Bio-technology (2001-2004), Government of Karnataka, Bangalore (27/07/2004). For more information on how political parties target different caste groups, see Shastri (1990) and Assadi (1999).

company. Prior to the STPIs, investors needed to go to some 25 government departments, with them the number fell to 5 or 6.²²

In addition to the infrastructure and customs services, STPIs also provided ‘mentoring’ services, such as training for software professionals, basic matchmaking, and marketing advice and follow-up to small firms. STPIs also had incubation facilities and ready-to-use offices for local SMEs.²³

There are now 39 government-run STPIs throughout the country, and the private sector has proceeded to build more.²⁴ However, Karnataka’s IT sector was given an important boost over its competitors as the Bangalore branch was among the first to be established. Set up in Electronics City in 1990, its superior infrastructure gave local firms a lead over those in other cities (Parthasarathy 2000:353).

The Bangalore branch (STPI-B) established a reputation as a particularly effective aid to industry, in part due to its Director, B.V. Naidu.²⁵ He had a flexible approach to regulations and established a good working relationship with the GoK, liaising between the state and central governments on IT-related issues.²⁶ According to one industry insider:

> In terms of policies, you have the STPs which were formulated when the industry was nascent... Naidu was a key person, as the policy framework of the GoI was pretty loose. Export over the satellite link was not a physical product, so it was hard for customs to value or track it. It was open to interpretations, so Naidu was positive and flexible and open to bending the rules.²⁷

---

²² Interviews with Deepak Kumar and Anand Parthasarathy, IT journalist for The Hindu, Bangalore (05/08/2004).
²³ While the wide-spread access to internet now means that participating firms do not have to physically locate in the parks, the tax incentives and expedited customs procedures still make membership de rigeur.
²⁴ Interview with R. Remali, Executive Officer, Software Technology Parks of India, Bangalore (23/06/2004).
²⁵ Interviews with R.V. Deshpande, Minister for Medium and Large Industry, GoK, Bangalore (04/08/2004), N. Muralidharan, Managing Director and Vice-President, Jobstreet, Bangalore (07/06/2004), and Vice-President, Sales and Marketing, Firm B, Bangalore (06/11/2004).
²⁶ Interviews with D.B. Inamdar and Vivek Kulkarni.
²⁷ Interview with S. Sivaguru, SME Special Interest Group, Software Process Improvement Network (SPIN), Bangalore (06/07/2004).
Naidu also regularly contacted the CEOs of leading companies to gather information and organize events. He promoted SMEs aggressively, encouraging the creation of industry-promotion bodies, such as the dynamic Software Process Improvement Network.28

The local STPI office is now one of the biggest in the country, employing 80 people in Bangalore, with another twenty spread across offices in smaller cities like Hubli, Manipal, and Mysore. Although it is a central government body, STPI-Bangalore competes with STPIs in other states, seeking to attract more investors than its counterparts.29

State Government Institutions

International Technology Park Limited (ITPL)

The GoK, following the central government’s lead, also moved to provide key infrastructure and facilities for firms. To this end, the International Technology Park was established in 1997 with a US$ 665 million investment.30

The ITPL provides specialised infrastructure for IT firms, such as reliable power and water provision. Facilities can be built on demand, and investors are also offered a range of ready-to-use offices. Furthermore, service providers for telecommunications, marketing, human resource consulting, and transport are on-site. Entrepreneurs can start operations within several days, and obtain all permits within a month.31

The ITPL has played a vital role through facilitating the installation of MNCs in Bangalore. Given their range of amenities, many investors first use the Park as a base, subsequently moving out once they are established. At present, the Park is 99 per cent full, catering to

---

28 Interviews with the General Manager, Firm D, Bangalore (14/06/2004), R. Remali, and S. Sivaguru.
29 Interview with R. Remali. Incidentally, the STPI seemed the most professionally managed of all central and state government agencies I visited.
30 The GoK is a minority share-holder, with a 6 per cent stake. The other partner is Ascenda, a Singaporean consortium that has similar parks in Hyderabad and other cities, and is now the biggest technology park manager in India. ITPL website, http://www.inttechpark.com/, accessed on 04/03/2006.
31 In addition to providing a professional business environment, the management tries to create an environment conducive to innovation by providing common areas for staff to meet, and reducing poaching
approximately 100 firms, 60 per cent of which are MNCs. The GoK, anticipating future expansion, has acquired more land nearby, and the ITPL has sparked a wave of investment in technology parks from the private sector.

However, while the Park has incubator facilities, less than one percent of its clients are SMEs. Rent is among the highest in Bangalore, and while supporting services are available, the Park is run as a for-profit organization, and no subsidized mentoring or follow-up services are available for smaller firms (Rao 2001:223, ITPL website).33

Policies

Central Government Policies

The GoI policies implemented in 1991 entailed the: reduction of the industrial licensing system; introduction of automatic clearances; liberalization of reporting requirements for production levels, location, and technology transfer; and reduction of strictures on foreign equity. These changes also transformed centre-state relationships from a top-heavy and interventionist framework to a ‘federal market’ economy. Prior to this, states competed with each other for resources from the central government. However, after liberalization, this competition changed form, as the central government transferred fewer funds to the states, who competed directly with each other for investment from a wider range of sources (Sinha 2004:26).34

Access to Finance

As regards software, the sector was helped immeasurably by the liberalization of the financial sector. While the GoI had attempted to provide venture capital through TDICI

---

through organising meetings of all HR managers in the Park. Interview with S. Sunath, Sales Consultant, ITPL, Bangalore (14/07/2004).
34 Interview with S. Sunath and Vivek Kulkarni.
34 For example, in 1978 the central government accounted for 63 per cent of investment capital, with state governments providing 18 per cent and the private sector 15 per cent. The corresponding figures for 1998 are 20 per cent, 20 per cent, and 47 per cent respectively (Sinha 2004:29).
and, subsequently, the National Venture Capital Fund, success was mixed. These funds were run too much like banks, and few ‘risky’ ventures or small firms were funded.

The boost to the industry came in 1995, when the GoI allowed foreign firms to set up private venture capital funds. This was vital, as venture capital firms were very important for enabling software SMEs to set up operations, through providing access to scarce capital and providing mentoring and advice. 35 Thus, due to its reputation and the existence of firms like TDICI, Bangalore became host to the largest venture capital firms, accounting for a third of all venture capital disbursed in India during 1998-2000 (Businessworld 26/02/2001).

Targeted Skills Provision

The GoI also moved to regulate and ensure quality standards for technical and scientific education, as during the 1980s, private higher education institutions had mushroomed, often to the detriment of quality (Frontline 26/03/2004). 36 Thus, the Government of India attempted to establish minimum standards for engineering colleges, through the All India Council on Technical Education (AICTE).

First established in 1987, the AICTE set up regional offices in the early 1990s, with the Karnataka office being established in 1993. 37 The AICTE developed a procedure for accreditation, stipulating minimum levels of land, computer facilities, and books for potential colleges. In addition, the Council drew up regulations on requirements for evaluation, appropriately qualified faculty, the total number of students allowed, and a minimum acceptable faculty/student ratio. The AICTE inspects colleges across the country and regulates the establishment of colleges by international investors. However, the AICTE is only concerned with teaching guidelines, and does not evaluate research. 38

35 In 1999, 80 per cent of all VC investments in India were made by foreign firms – many owned by non-resident Indians (Upadhya 2003:5-6, 11, 2004:13).
36 Interview with A.S. Seetharamu.
37 Interview with M.R. Narayana, Professor, Economics Unit, Institute for Social and Economic Change, Bangalore (08/07/2004).
38 Interview with Dr. S.P. Singh, Deputy Regional Director, AICTE, Bangalore (13/07/2006).
In spite of its responsibilities, the AICTE has been criticised for its limited success at managing the sector’s rapid expansion. In reality, the Council’s function has been limited to merely licensing or accrediting established institutions, rather than actually enforcing quality standards (Frontline 25/12/1999).39

**State Government Policies**

During the 1990s, the Government of Karnataka underwent a sea-change in policy. Up until the mid-1990s, the state government continued with its traditional industrial policy framework, which was largely based on incentives and mediocre investment facilitation services. However, faced with increased competition from neighbouring states, the GoK became more responsive.

**General Policy Directions**

During the early 1990s, the GoK continued its traditional approach to economic policy, as the 1990-95 Industrial Policy focussed on addressing regional imbalances and fostering the growth of the state’s existing industrial concerns. However, the 1991 reforms entailed a greater role for state governments to court investment and promote economic growth. Thus, policy matters such as incentives, infrastructure, fiscal discipline, and even negotiating with multilateral institutions were now more clearly state-level responsibilities (Rudolph and Rudolph 2001:1542, Sinha 2004:34).

Thus, the Policy was reformulated and changes introduced in 1993. Investment in infrastructure was to be promoted, agricultural land to be converted for industrial use, and a ‘single window’ agency to be created. Software was mentioned for the first time as a ‘thrust’ sector to be promoted through tax incentives (Rao 1995:6-7, Lateef 1997:26). The 1996-2001 Industrial Policy focussed more on providing infrastructure for industry, seeking to address long-standing bottlenecks. However, in both cases, results were hampered by mediocre levels of institutional capacity.

---

39 My interviewee at the AICTE, a Deputy Director, was unable to speak Kannada, English, or Hindi fluently – raising questions as to how the Council can effectively control quality issues beyond simple verification of
In the late 1990s, the GoK began to move more proactively – due to increasing competition from other states for leadership of the software sector. States like Tamil Nadu, Maharashtra, New Delhi, and, in particular, Andra Pradesh were serious rivals. Chandrababu Naidu, the Chief Minister of Andhra Pradesh, was adept at projecting the image of his state as IT-friendly, attracting investments from industry majors like Microsoft, Oracle, and IBM, and inaugurating several technology parks that rivalled Electronics City and the ITPL (Rudolph and Rudolph 2001:1542, Eischen 2000b:11).

In 1997, the GoK released an Information Technology Policy – ahead of the GoI and other states - to chart the development of the sector. In addition to providing a series of benefits for the IT sector, the Policy was accompanied by institutionalised dialogue with IT firms, through creating a taskforce comprised of the heads of relevant GoK agencies and representatives from 15 leading IT companies. The Taskforce was to meet every three months to track progress in implementation.

Infrastructural Provision

By the early 1990s, Karnataka was suffering from prior under-investment in infrastructure. In 1993, the supply of electricity was 25 per cent below requirements, water provision was sporadic, and the road system in and around Bangalore and Mysore was severely strained (Krishnakumar 1999:204). Even in Electronics City, the GoK’s IT park, tenants complained about power cuts and inadequate water supply. Investors also complained about the airport, which operated at nearly ten times its capacity. In addition, Bangalore had the same number of cars as New Delhi – with only half the population (Stremlau 1996:161, Lateef 1997:43).

With regard to other states, Karnataka’s performance was mediocre. In 1996, Karnataka’s infrastructure ranked 8th among the 15 biggest states, well behind competitors like Tamil Nadu, Maharashtra, Gujarat, and Andra Pradesh (Thimmaiah 2005:21). A 1997 survey of firms in three of India’s industrial centres – Bangalore, Mumbai (Maharashtra), and...
Ahmedabad (Gujarat) – found Bangalore’s infrastructure was significantly worse than the others (Gupakumar 2000:223). 42

The 1996 Policy attempted to address some of these issues. It contemplated a new international airport with financing from the GoK, the Tata Family, and US and Singaporean companies. The Policy also foresaw a US$ 1.2 billion Mass Rapid Transit system to be built by a consortium of Korean, Japanese, and US companies. It also planned to re-develop the highway between Bangalore and Mysore, and included a US$ 230 million project for upgrading Bangalore’s infrastructure, as well as a US$ 150 million ADB-funded project to develop four satellite cities to take the pressure off the capital (Krishnakumar 1999:197-98, Benjamin 2000:38). However, success at addressing these issues was only partial and often required years of negotiation between investors and both levels of government. 43

Progress on utilities such as water and electricity was not so important, as IT firms responded by building their own facilities or locating in a technology park, where these problems were supposedly taken care of. 44 In addition, the 1997 IT Policy helped through expanding Electronics City, exempting software firms from power cuts, and giving incentives for the private sector to establish other software technology parks. However, firms were less able to by-pass other issues such as the road network and the international airport.

Investment Promotion

During the 1990s, the GoK’s ability to liaise with investors was impaired by bureaucratic inertia and corruption. Leading IT entrepreneurs, such as Infosys Chairman Narayana

42 A full 87 per cent of entrepreneurs in the city thought that electricity provision had deteriorated over the past three years, with eighty-six per cent opining the same for roads and 60 per cent for water.

43 The planned Mass Rail Transit attracted potential investors, most notably the Tata family. However, a lack of consensus on the fare structure prevented the initiative from going ahead, and the investors pulled out. The Chief Minister announced the closure of the initiative in 2002. Environmental clearance for the Bangalore-Mysore expressway was only obtained in 2001, with construction beginning in 2003 (Frontline 03/06/2005). Construction on the airport was delayed until 2005, due to a lack of clarity regarding its location and ownership structure (http://www.karnataka.com, accessed 04/03/2006).

44 ‘In terms of what the industry wants, the most important is readily available HR talent. Infrastructure is secondary, as big companies have their own already’. Interview with N. Dayasindhu, Research Officer, Infosys, Bangalore (21/06/2004).
Murthy complained about the GoK’s lack of planning, agility, and attention to industry needs, and local and international investors complained about slow turnaround times and excessive bureaucratic hurdles (Heitzman 2004:202). A survey of more than 100 large scale investments in Karnataka (35 per cent of which were in the IT sector) found that almost 60 per cent of respondents stated that corruption was a serious disabling factor (Paul 2000:3865).\(^{45}\)

However, the heightening competition from neighbouring states had a galvanising effect on the government, particularly with regard to investment promotion and infrastructural facilities for investors (FEER 22/08/2002). According to one industry observer:

> Things are getting better, as earlier you had complaints about too much red tape and about getting permission to set up shop. Now it is a given. Now the emphasis is on infrastructure….Bangalore has faced the danger of losing its edge - Naidu convinced Microsoft to locate in Hyderabad.\(^{46}\)

The IT Taskforce was also a useful mechanism for voicing concerns and targeting specific issues for action, and GoK officials could no longer take increasing levels of investment for granted.

**Addressing Coordination and Information Externalities**

As part of the drive to move ahead of other states, the state government began, in a limited way, to address coordination and information externalities facing firms.

The 1997 IT policy stipulated government help for SMEs to obtain quality certification, such as ISO 9000 and CMM credentials, to help tap overseas markets (GoK 1997). And, in

\(^{45}\) However, it would appear that corruption did not constitute such an onerous burden on software firms. Paul states that: ‘Software industry respondents complained the least about corruption and felt that they have been able to avoid corruption. Software is the least dependent on clearances, approvals, and regulatory supervision by government officials. They need little government help in land acquisition, and power and communications. They manage on their own if the concerned government agencies do not assist them. If non-cooperation is severe, they can use the threat of ‘exit’ while dealing with indifferent officials. Software investors can shift their locations to another state with ease, as they are much less dependent on immovable assets’ (2000:3867).

\(^{46}\) Interview with Deepak Kumar.
1998, the GoK started a yearly event called Bangalore IT.com to showcase its software sector and the capabilities of local firms. It has been held every year since, and is now recognized as a major event for the industry (Rediff Online 18/08/1998, Dataquest 20/09/1999).

Access to Finance

The GoK also moved to address the shortage of credit, through establishing its own venture capital fund, KITVEN.47 The Fund has a US$ 3 million purse and is designed to help budding IT entrepreneurs grow enough to qualify for bank loans. Proposals are evaluated by the state government as well as industry experts. Criteria are strict and, to date, only 12 proposals out of 450 applications have been funded – mostly for export-oriented, service-based firms. The financing is disbursed in stages, with follow-up provided by KITVEN’s experts.48

Provision of Skilled Workers

One area where Karnataka stood out was the quantity and quality of its human resources.49 Indeed, in 1999-2000, Karnataka had 82 engineering colleges, 185 polytechnics, 932 general colleges, and 6 state universities, in addition to elite institutions like the IISc and IIM-B (World Bank 2002:4). While the universities were funded by the central and state governments, almost all colleges were private sector institutions, which thrived on demand from local and intra-state residents and the state’s liberal policies.

In particular, Karnataka’s competitive advantage lay in its engineering colleges, which had an intake of 30,000 students.50 More than the quantity of students, Karnataka’s strength was the quality of its education. Indeed, while states like Andra Pradesh, Maharashtra, and

47 Karnataka Information Technology Venture Capital Fund.
48 The Fund has had some successes, mostly notably ReIQ, a software product validation company that generated US$ 13 million in 2003. Interview with Manish Kumar, Technical Officer, KITVEN, Bangalore (26/05/2004).
49 ‘In comparative terms, Bangalore is significantly ahead, because the education system is so good’. Interview with N. Muralidharan, Managing Director and Vice-Present, Jobstreet.com, Bangalore (07/06/2004).
Tamil Nadu now have similar numbers of engineering colleges, they were established some 10-15 years later, and do not have the same reputation for quality. In 1998, the GoK also moved to regulate the quality of the different colleges by requiring them to affiliate with a state-run technical university. And, in 1999, the state government established the Indian Institute of Information Technology – Bangalore, in order to provide engineers with advanced qualifications for the IT sector.

**Summing Up**

Thus, unlike the Penang State Government that proactively fostered its chosen industry, the GoK only gradually became aware of the software sector. When it did so, it moved to address issues regarding infrastructure, finance, marketing, and manpower provision. However, the GoK clearly saw itself as playing a supporting rather than a leading role for the IT industry. Thus, according to the IT Secretary at that time,

>...it is much better to really follow the developments and promote it as and when they reach out to you rather than articulate it and get them to follow you, so you end up with a running mate situation rather than follow the leader... so it is better to have a good listening post and be proactive in terms of handling the software industry rather than try and globally anticipate movements and then analyse them. They are really on the forefront on their own and what they needed was basic support systems. (S. Das Gupta in Mitter 2000:17)

**Outcomes**

At the beginning of the 1990s, Karnataka was, along with Maharashtra and New Delhi, an aspirant to the leadership of the software sector. However, the industry’s ‘window of

---

50 ‘There was not a lot of competitive advantage [in Karnataka], the exception was its engineering colleges, which constituted a critical mass. There was a fairly liberal education policy, and you could set up colleges but not universities’. Interview with Deepak Kumar.

51 For example, Andra Pradesh’s education sector only began to expand during the 1990s, increasing from 32 colleges in 1995 to 174 in 2004. Kerala’s was only liberalized in 2001 (Joseph 2004:53). Furthermore, colleges in Andra Pradesh have acquired a reputation for variable quality. Interviews with Vivek Kulkami, Rupa Chanda, and Murali Patibandla, Professor, Corporate Strategy and Policy, IIMB, Bangalore (09/07/2004).

52 Interview with M.R. Narayana.
locational opportunity' was still open, as software firms were being set up in a variety of locations and no one location was predominant.

During the course of the decade, the industry spread rapidly throughout India. Demand from overseas markets grew, many mid-level employees left the more established domestic firms to create start-ups and more MNCs began to set up operations in the country (Athreye 2003:21-22).

Karnataka’s software sector grew the quickest, outstripping rival states. As seen in Diagram 8.1, the number of firms in Bangalore’s Software Technology Park grew swiftly, from 13 in 1991-92 to more than 780 in 1999-2000. In addition, Bangalore came to host 152 headquarters of Indian software companies, compared to Mumbai’s 122, Chennai’s 93, and Hyderabad’s 34 (Heeks 1998:12). Small groups of firms also began to emerge in Karnataka’s secondary cities, most notably Mysore and Manipal (KSDIT website).

**Diagram 8.1**

![IT Firms in Bangalore's Software Park (1991-2000)](http://www.bangaloreit.in)


Due to the sector’s rapid expansion and low skill requirements, there was little need for differentiation between companies. Growth was essentially due to ‘replication’ as firms did

---

more of the same, low-skill activities. Thus, expansion of the industry throughout the country was ‘horizontal’ rather than ‘vertical’ or due to deepening capabilities. That said, in spite of being dynamic and fast-growing, there was no evidence of collective efficiency or greater speciation among firms in Bangalore (Saxenian 2002:185).

However, Karnataka began to benefit from agglomeration effects, as the potential client base, the pool of skilled workers, and the possibilities of spill-overs attracted more firms. In particular, MNCs, following Texas Instrument’s example, began to set up development centres in Bangalore. Offering higher wages, these centres, in turn, attracted more IT workers from surrounding states (Parthasarathy 2000:24).

The IT industry came to represent an important component of Karnataka’s economy and a contributor to its growth. From a mere US$ 2 million in 1991-92, the IT sector grew to earn almost US$ 950 million in 1999-2000 (KSDIT website). And, by the end of the 1990s, the IT sector accounted for more than three per cent of the state’s gross regional product (GRP) and almost a quarter of its annual growth (Table 8.1). Due to this, among other factors, Karnataka enjoyed very high growth rates during the 1990s, often considerably above ten per cent.

Table 8.1
Selected Economic Indicators for Karnataka (1993-1999)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GRP</td>
<td>2.4</td>
<td>2.6</td>
<td>2.7</td>
<td>3.1</td>
<td>3.0</td>
<td>3.4</td>
</tr>
<tr>
<td>GRP</td>
<td>22.7</td>
<td>27.5</td>
<td>22.8</td>
<td>23.9</td>
<td>20.0</td>
<td>22.4</td>
</tr>
<tr>
<td>GRP</td>
<td>16.6</td>
<td>17.3</td>
<td>15.9</td>
<td>10.0</td>
<td>22.4</td>
<td>8.5</td>
</tr>
</tbody>
</table>

Source: Narayana (2005: Table 1)

However, this success must be kept in perspective. While Karnataka enjoyed high rates of growth during the 1990s, it was still a middle-income state by Indian standards. While the IT sector had enjoyed unparalleled expansion, some three quarters of the state’s population was still living in rural areas and had not enjoyed its benefits (Batabyal 2001:28).

---

54 Interview with A.S. Seetharamu.
55 Interviews with Murali Patibandla, Krishnan Puthucode, Firm B, and N. Muralidharan.
In addition, the IT sector was not the only economically important industry, as Karnataka was also an important producer of electronics, steel, cement, sugar, and coffee. While on one hand, these groups required similar outputs and policies from the GoK, on the other, the IT sector was already receiving comparatively more benefits and incentives.57

Furthermore, Karnataka’s fiscal health began to deteriorate in this new, more competitive context. This was due to inadequate cost-recovery from public services, more and bigger incentives for investors, and greater spending on infrastructure. In 1993-94, Karnataka’s fiscal deficit was 2.8 per cent of GRP, and by 1999-2000 it had risen to 4.3 per cent (Twelfth Finance Commission website58, Gayithri 2003:230). However, this coincided with a general worsening of finances across most states. Thus, in spite of its growing fiscal woes, Karnataka was still considered, along with Tamil Nadu, Andra Pradesh, Gujarat, and Delhi, as a financially sound state (Businessworld 20/12/1999).

**Summing Up**

During the 1990s, the IT sector grew rapidly across the country. However, Karnataka emerged as the industry’s leader, due to its unrivalled ‘spatially-fixed competitive advantage’.

At the central level, the GoI helped the IT sector through: reducing its regulatory burden; providing specialised technology parks; and establishing standards for the country’s technical education system. Unlike in Malaysia, where Penang did not enjoy federal government support, in India, the GoI specifically helped Karnataka through establishing one of the first STPIs in Bangalore, and continuing to locate research and defence institutions in the city.

With regard to Karnataka, at the political level, the province continued its tradition of alternating parties in power, more inclusive political coalitions, and relatively cautious

---

57 'The software industry does not pay tax, and they still want better infrastructure.' Interview with Gurunath Kulkarni, KUM. During my interview, Kulkarni implicitly downplayed the importance of the IT industry, emphasizing the state’s other sectors.
policy implementation. While, unlike Penang, this did not result in a compact between the state and the emerging IT sector, it also meant that Karnataka’s political stability and commercial environment were not affected.

There was little industry or IT-relevant policymaking during the early 1990s, as state level policymakers did not realize the software sector’s potential. However, due to its rapid growth and emerging competition from other states, the GoK began to respond, paying more attention to infrastructure, marketing, and human resources. While GoK efforts at marketing and ensuring quality education were good, its efforts at dealing with the state’s pressing infrastructural issues were not very effective.

That said, this did not detract significantly from Karnataka’s ‘location-bound’ assets. On one hand, the IT industry was not heavily reliant on physical infrastructure and entrepreneurs in Karnataka were able to by-pass this through locating in technology parks. On the other, Karnataka had emerged as a comparatively responsible, fiscally prudent, and reasonably efficient state government. Furthermore, the state had an unbeatable human resource base, which provided the prime raw material for the rapidly expanding IT sector.


During this period, Karnataka came to more closely resemble Penang in its developmental hey-day as a ‘developmental combination’ of institutions began to come together. Thus, there was more stable political leadership, the emergence of a ‘pocket of efficiency’ within the state government, and greater communication between the state and software entrepreneurs. This coincided with continued growth in the software sector and the consolidation of Karnataka’s leadership of the software sector. However, unlike in Penang, wider political events eventually curtailed the potential of this state of affairs.

The Political Context

By the end of the 1990s, Karnataka's political context had changed markedly. At the beginning of the decade, the IT sector was small and had limited political and economic clout. Now, however, it directly employed at least 100,000 people, with many more in a variety of supporting services. Furthermore, individual IT entrepreneurs came to acquire substantial political weight, due to their prestige, large workforces, and sizeable donations to public-private initiatives.

The Krishna Administration

The Congress party, under S.M. Krishna, won a solid majority in the 1999 State Assembly elections. During its period in the opposition, extensive work had been carried out to rebuild the party's internal structure and grassroots support. As a result, once in power, Krishna faced little internal dissent and no leadership challenges, enjoying an unusually long and stable tenure (Manor 2004:8).

Krishna established a reputation for good, technocratic management. Unlike many of his predecessors, he did not seek to centralize power, but rather delegated it to senior ministers in his cabinet. Krishna also sought to build on the previous administration's achievements, marking an unusual degree of policy continuity in strategic areas (Frontline 06/11/1999 27/10/2001). Under his administration, the GoK stressed fiscal prudence and entered into negotiations with the World Bank, rapidly securing some US$ 850 million in loans for water provision, infrastructure, and fiscal management (Kirk 2005:309).

59 Presentation by Shankaralinge Gowda, Principal Secretary for Information Technology, GoK, IIM-B Conference, Cross-border Dynamics in India's IT Sector, Bangalore (02/07/2004).
60 For example, Infosys alone employs some 19,000 IT workers in Bangalore, Mysore, and Mangalore (Frontline 05/11/2005).
61 Interview with Anand Parthasarathy.
62 Interviews with Vivek Kulkarni and Deepak Kumar.
Krishna also established a political alliance with the IT sector, through his rhetoric and appointing industry leaders to high-profile positions. Within weeks of assuming office, Krishna established the Bangalore Action Taskforce (BATF). Headed by Nandan Nilekani, CEO of Infosys, and comprised of the heads of government departments, CEOs of leading IT companies, and prominent personalities, the BATF was tasked with formulating a plan to improve Bangalore’s infrastructure, raise funds from the private sector, and enhance service delivery in line ministries.

The BATF proved to be a success. This was due, in part, to Krishna’s unequivocal support and diplomatic skills. He took care to ensure harmonious relationships between the Taskforce and state bodies and insulate the process from short-term political considerations. By sourcing in high level IT and business expertise, the BATF was able to provide sound policy advice to many spheres of government. In addition to raising US$ 4.5 million from the private sector for infrastructure, the BATF also dramatically improved revenue flows to the local government by computerising land holdings and tax records. Periodic surveys also revealed higher levels of public satisfaction with service delivery (Heitzman 2003:74, Paul 2004:1).

While effective, this was not always popular. Krishna sought to discredit charges of an urban bias by pointing out that the BATF did not require additional public revenue. In addition, he promoted initiatives to spread the benefits of IT outside urban areas. Thus, during his administration, the GoK implemented the most significant IT initiative for rural areas in the country by computerising 20 million land records (World Bank 2005:2).

63 Interestingly, Krishna often makes references to the first Chief Minister of Mysore, Visvesvaraya, citing his ability to harness technology to foster economic growth and modernize the state. See, for example, Krishna (2001:2).
64 For example, Narayana Murthy, Chairman of Infosys, was appointed to the Board of the consortium building the new airport.
65 Krishna pledged that Department Heads would not be rotated for at least two years after the start of the initiative to promote policy continuity. Furthermore, the BATF reported directly to the Chief Minister, and only presented its findings and progress every six months to a public forum (Heitzman 2003:74, Manor 2004:8-13).
66 'S.M. Krishna was in power for a long spell. He was IT-friendly, implementing the motto ‘don’t hinder if you can’t help’. Through the BATF, private entrepreneurs have contributed a lot to the state. Elsewhere in the country, the private sector could not do anything. In Bangalore they got their freedom.' Interview with Anand Parthasarathy.
67 For example, Nandan Nilekani, CEO of Infosys, personally contributed US$ 1 million.
In spite of this, Krishna’s allegiance to the IT industry, coupled with its perception as an exclusively urban concern, undercut Congress support in rural areas. Notwithstanding the state’s rapid growth, only 30 per cent of the population was urban with the remainder directly or indirectly connected to the agricultural sector (Scoones 2003:3). Furthermore, Karnataka was blighted by drought in three out of the five years of the Krishna administration. This, coupled with poor credit facilities, falling agricultural prices, and increasing electricity prices led to frequent suicides in farming communities (Frontline 08/05/2004 18/06/2004).

The 2004 Elections

These events sealed Krishna’s fate. In spite of his solid performance for Bangalore, rural constituencies voted overwhelmingly for Janata Dal or the BJP, which had been gaining ground in the state (The Hindu 06/06/2004).

Congress and Janata Dal entered into a coalition, largely to prevent the BJP from assuming power. The incoming administration went out of its way to stress its commitment to rural areas, with the Chief Minister stating that while he was not ‘against IT’ his priority was agriculture (Frontline 05/11/2005).

These new developments dealt a serious blow to the emerging compact between the IT sector and the GoK. The administration’s first budget contained no new spending on urban infrastructure or incentives for the IT sector; and in addition, it proposed increasing taxes on IT goods to pay for investment in rural areas. The BATF was allowed to wither, and the Chief Minister stopped attending high-profile IT events (The Hindu 10/06/2004, Outlook 09/08/2004, the Economist 23/04/2005).

This prompted an outcry from the IT sector. Citing wage pressures, high attrition, and crumbling infrastructure, Wipro and other industry majors declared plans to expand outside

---

68 ‘It has been difficult to enlighten rural voters and convince them of the benefits [of the IT industry]’. Interview with R.V. Deshpande. ‘States do not win elections on these issues, rather they lose them. They need to be seen as pro-rural areas, not pro-cities’. Interview with N. Dayasindhu.

69 More than 650 farmers killed themselves in the year leading up to the elections.
of Karnataka (Outlook 09/08/2004, Rediff Online 19/01/2005). In addition, Infosys and Wipro threatened to boycott the annual BangaloreIT.com event, and were only mollified after specific infrastructural investments were agreed upon in a private meeting with government ministers (Indiainfo 22/09/2005).

In spite of this rapprochement, relations between the Singh administration and the IT sector remained tense. Furthermore, the GoK’s ability to effectively implement policies was undermined by disputes between the coalition partners over the allocation of senior posts and overall policy directions (Frontline 01/01/2005, Indian Express 18/01/2006). 70

While relations between the state and private sector definitely improved after 1999, it cannot be said that there was fluid, constant communication between the two. A constant theme among IT firms was the limited capacity of the government to attend to even the most basic needs. 71 Nandan Nilekani, CEO of Infosys publicly stated that ‘the government should focus on infrastructure and let industry take care of the rest’. 72 Similarly, Kiran Karnik, NASSCOM President, declared that ‘We don’t want the government to do anything for IT companies but focus on things like power, infrastructure, and so on. [The] industry has reached maturity and doesn’t need individual champions’ (Deccan Herald 24/05/2004).

The Institutional Context

After the importance of the software sector for Karnataka’s economy became obvious, a variety of central and state government institutions were established, as well as business groupings, and research institutes. As in Penang, these institutions addressed some market failures, but they did not meet the needs of small software firms or create a regionally-specific institutional environment to foster the sector’s growth.

---

70 In January 2006, the government was brought down when a Janata Dal faction crossed the floor and formed a coalition with the BJP. The new Chief Minister, Kumaraswamy, is seeking to balance commitments to both the agriculture and IT sectors. In particular, he has pledged to deal with the most pressing infrastructure issues within 12 months (Economic Times 13/02/2006).

71 One of my interviewees said her firm’s policy was to avoid contact with the government altogether. Another expressly that ‘the government should stay away [from IT firms]’.

72 Nandan Nilekani, Managing Director, Infosys, Inaugural Speech at the NASSCOM ITeS/BPO Summit, Bangalore (09/06/2004).
Central Government Institutions

During this period, the central government did not establish new institutions for the software sector. The Software Technology Parks initiative continued to spread throughout India, and the Bangalore branch continued to promote the development of its local software sector. However, following greater decentralization in the wake of the 1991 reforms, the central government began to establish regional offices of relevant agencies such as the Electronics and Computer Software Export Promotion Council (ESC) in different parts of the country.

The Electronics and Computer Software Export Promotion Council (ESC)

Established in New Delhi in 1989, the ESC set up a regional office in Bangalore in 2000 which also provides service to firms in Karnataka and Kerala. The office is small, with a full-time staff of two. Notwithstanding this, the Karnataka membership base is comparatively large with 450 firms, of which about 60 per cent are in the software sector. Through the regional office, the Council targets smaller firms through grants for marketing, subsidising participation in overseas exhibitions, and providing basic market intelligence. The regional office also organizes 7-10 conferences per year on industry relevant topics.\(^{73}\)

However, the effectiveness of ESC’s work has been limited at the local level. The regional office has been working without a senior official, which lowers the profile of the Council and slows decision-making. In addition, the Council does not have much contact with other central or state government agencies\(^{74}\) and the ESC is not very well known among Bangalore-based firms.\(^{75}\) According to one industry observer, the Council is a ‘fringe player’.\(^{76}\)

---

73 Interview with Surjith Singh, Senior Executive, ESC, Bangalore (18/06/2004).
74 The three GoK senior ministers I interviewed either did not mention the ESC, or included it as an afterthought.
75 None of the firms I interviewed were using the ESC, and most did not know it.
76 Interview with Deepak Kumar.
State Government Institutions

In contrast, the Government of Karnataka now moved aggressively to create an institutional infrastructure to enable its software sector to grow faster than other rival states.

The Karnataka State Department of IT (KSDIT)

The Department of Information Technology had been established under the Hegde administration during the 1980s. Falling under the jurisdiction of the Ministry of Medium and Large Industry, the Department had a very small budget and a staff of one – albeit an elite IAS official. While the Department assumed a more visible role in the late 1990s with the IT Policy and BangaloreIT.com, it was really only under the Krishna administration that it had the resources and autonomy to effectively help the IT sector.

First, under a re-vamped IT Policy, Krishna established the KSDIT as an independent body, answering directly to him. All other relevant IT-related agencies, such as KEONICS, were placed under the Department’s control, which assumed all responsibility for relevant clearances, permits, and incentives. A new agency, the Karnataka Biotechnology and Information Technology Services (KBITS), was established to act as a liaison with investors – also under the KSDIT. In addition, all IT-related agencies, including the Gol’s ESC and the local NASSCOM branch were physically grouped together in the KSDIT building to facilitate communication.

After the Department’s upgrade, Krishna then replaced the Secretary with a hand-picked successor. The new IT Secretary, Vivek Kulkarni, was an IAS officer who had previously worked in the Department of Finance under Krishna, and had direct access to the Chief Minister’s office (Scoones 2003:11).

The KSDIT quickly established a reputation as an efficient, effective government agency along the lines of the Penang Development Corporation. As with the Gol’s Department of Electronics, the KSDIT was not attractive for patronage purposes due to its low budget and

77 Interview with R.V. Deshpande.
small staff numbers. Furthermore, Kulkarni was able to take advantage of the Department's newness to handpick people for key positions. In particular, Kulkarni aimed for an agency with fewer people and more streamlined administrative procedures. As he states 'what was useful was that the IT Department was a new department, so I could choose people. I wanted less hierarchy. Normally an under-secretary would have 18 people [working for him], but I had only one. This was a lean organisation.'

Kulkarni proved a successful lobbyist with both local and international firms, receiving an average 125 visits a year. In spite of lukewarm relations between the GoI and the GoK, he was also able to establish good working relationships with locally-based central government counterparts such as the STPI. In addition, the KSDIT worked well with NASSCOM, sometimes using it as a conduit to push for national level legislation (Lema and Hesbjerg 2003:74).

Kulkarni's task was aided by high-level political backing, most notably the Chief Minister's Task Force on IT. Along the lines of the BATF, the Task Force on IT brought together the CEOs of the Karnataka's biggest IT companies, such as Infosys and Wipro, as well as B.V Naidu from STPI-B, and Kulkarni himself to oversee key measures for the sector.

These good contacts, coupled with the KSDIT's political backing and ensuing autonomy enabled it to move quickly. As Kulkarni states

What helped was that nobody understood what was going on. This built in flexibility. All expenditures had to be approved by the Task Force. I was able to finesse this due to my tenure in the Department of Finance. This kept things away from the Government of Karnataka. One bureaucrat said that he wanted to see all expenditures over 25 rupees. I said that I had delegated this to others, and thus could not provide him with that information.

78 Interview with Vivek Vulkarni.
79 Interview with Vivek Kulkarni.
80 Interview with Vivek Kulkarni.
As with the PDC in Penang, the KSDIT was able, through its autonomy and communication with firms to implement a range of enabling policies. However, this was short-lived, as Kulkarni left the public service in 2003 to enter the private sector, and the political context changed soon after, eroding the institution’s capacity to promote change.

Business Associations

With the growth of the IT industry, diverse business groups were formed to represent particular groups and constituencies. In spite of Bangalore’s vibrancy, most associations established regional offices there after the industry was well established, thus contributing little to the development of a regionally-specific institutional environment.

The National Association of Software and Services Companies (NASSCOM)

As discussed in Chapter Seven, NASSCOM emerged as the IT sector’s premier intermediary organization. Established in 1988, its main aim was to lobby the GoI for key policy changes and promote the industry’s image abroad. As such, NASSCOM’s focus was almost exclusively national and it only began to establish a presence at the state level after 2000. The Karnataka Office was established in 2002 – after requests were made by local IT firms.

Despite being initially established by a group of small software firms, NASSCOM is now frequently charged with neglecting smaller firms, as its four largest, and founding, firms

---

81 I interviewed three other business associations in Bangalore: the Federation of Karnataka Chambers of Commerce and Industry (FKCCI); the Confederation of Indian Industries (CII); and the Manufacturer’s Association of Information Technology (MAIT). FKCCI draws some 65 per cent of its membership from trading firms with the balance from industry. Catering to older sectors, the Federation’s membership has now stopped growing and only has some 30-40 IT firms. FKCCI provides information, marketing, and networking services. The CII has six offices in Karnataka and is involved in more modern sectors such as hospitality, healthcare, and IT, as well as industry. In addition to information services, CII places a lot of emphasis on quality control, promoting the adoption of ISO standards. It has an SME cluster pilot project, however to date, membership consists of manufacturing firms. MAIT is for firms that produce computer hardware and has 50 members in Karnataka. MAIT works with NASSCOM on most policy issues, particularly those to encourage greater IT penetration. Interviews with T. Ramappa, Secretary, FKCCI, Bangalore (13/07/2004), D. Sood, Regional Manager, CII, Bangalore (21/07/2004), and K.S. Nandakumar, Regional Director, MAIT, Bangalore (30/06/2004).

82 Interview with S. Sivaguru.
receive the bulk of the benefits.\textsuperscript{83} Its membership dues are expensive for small firms, it tends to showcase only the most established companies, and most of its research, policy advice, and lobbying are of interest only to larger firms.\textsuperscript{84}

Until recently, NASSCOM did not provide financing, training, help with quality certification or product testing, or matchmaking services. In addition, in prioritizing its largest members who focus on services, NASSCOM has allegedly neglected product development firms.\textsuperscript{85} Furthermore, the Association’s marketing strategy of India as a low cost location has proven a constraint for many firms who want to gradually take on more sophisticated tasks. In 2002, NASSCOM established an SME working group to address these criticisms.\textsuperscript{86}

Thus, while NASSCOM has undeniably marketed India well, it has proved less adept at: establishing a local presence, providing relevant services for smaller members, or encouraging more collaboration between firms.

\textit{The Indus Entrepreneurs (TiE)}

TiE was established in 1992 by Indian software professionals working in Silicon Valley. The association acted as a broker between successful entrepreneurs and small software firms who were in need of detailed technical advice and venture capital. Through its efforts,

\textsuperscript{83} Conversely, NASSCOM is now being disregarded by the bigger IT firms, who find that they get more traction by approaching policy-makers directly – particularly given their relatively easy ‘exit’ option. In addition, while NASSCOM’s research and market intelligence is relatively good, it does not match the sophistication of leading edge market research firms. One industry observer says that ‘NASSCOM is a lobbying and PR firm. Their research is actually not very good, and they don’t address the core issues. There is no stand on educational policy, and their actions are very much flavour of the month, going from IT, to ITeS, then Business Process Outsourcing. The big guys don’t take NASSCOM seriously and in the event of a dispute, they would not go through them, but negotiate directly. Also the services that they offer are not really needed by the big guys. Why would you pay NASSCOM for market intelligence when you can hire the professional guys?’ Interview with an industry observer, Bangalore (June 2004).

\textsuperscript{84} ‘NASSCOM is a beauty parade. There is no forum to showcase the smaller guys. It is difficult to deal with Indian majors. They are not ready to build a value chain as they want it all’. Presentation by an SME owner at the SPIN workshop ‘Moving up the value chain’, Bangalore (25/06/2004). Interviews with Murali Patibandla, N. Muralidharan, Rajendra Bandi, S. Sivaguru, and the General Manager of Firm D, Bangalore (14/06/2004).

\textsuperscript{85} Interviews with the Chief Operating Officer of Firm C, Bangalore (11/06/2004), and Vice-President, Sales and Marketing, Firm B, Bangalore (11/06/2004).

\textsuperscript{86} Although tardy, the SME group now has mentoring services, trade delegations for SMEs, information meetings, and pilot projects for SMEs to pool human resources and collectively obtain quality certification. \url{http://www.sme.nasscom.in/}, accessed 04/03/2006.
TiE enabled the growth of a generation of Indian firms and came to embody the potential of ethnically-based business networks (Saxenian 2000:ix).

The association set up its first Indian chapter in Bangalore in 1999. TiE has approximately 250 members, of which a third are small start-ups, another third are venture capitalists, and the remainder are in IT-related sectors. The Bangalore chapter aims to provide networking and mentoring opportunities, as well as access to capital for small firms.

However, TiE has a limited presence in Bangalore. There is no office and staff is part-time. Regardless of its aim to promote venture capital opportunities for smaller members, it is more of a community of established firms, with roots in Silicon Valley. Furthermore, the association’s core strength is to place start-ups in contact with Silicon Valley-based entrepreneurs, rather than enable a more dynamic and collaborative local environment (Upadhya 2003:24-25).87

Software Process Improvement Network (SPIN)

SPIN is a global association that provides a forum to discuss ideas on software process improvement. It is entirely voluntary, free, and has no business objective (SPIN website88). The network strives to promote better software development quality and process capability, as well as enabling its members to enhance their professional skills and network. SPIN also attempts to ‘reduce the reluctance to interchange’ between firms in order to foster more collaboration, speciation, and collective efficiency.

The Bangalore branch started in 1991 and is the network’s second largest in the world, with more than 1,000 members – of which approximately 100 are consistently active. The membership is largely composed of big, established firms. There are monthly meetings, hosted by different firms, where members give presentations on different industry-related issues (SPIN website).89 While SPIN has not received much support from the GoK or

87 Interviews with Vivek Kulkarni and Vignesh Ilavarasan, Postdoctoral Fellow, IIIT-B (29/07/2004).
89 Interview with Rajendra Bandi, Associate Professor, Chairperson, Centre for Software and IT Management, IIM-B, Bangalore (13/07/2004).
NASSCOM, the Bangalore STPI, through B.V. Naidu, was an early and ardent supporter).  

Members gather in ‘special interest’ groups to work on particular topics, such as project management, benchmarking quality, and fostering SMEs. Firms in each special interest group share marketing information and discuss scenarios, with a side benefit to the technical discussions being that firms learn to work together. However, information pertaining to costs is withheld.  

While SPIN is free and works to increase firms’ process capabilities, it has been hard to attract and retain participating SMEs. In part, this is due to a reluctance to share information, as well as a perceived bias towards large firms. In addition, SPIN does not help firms with marketing opportunities. Furthermore, while firms can be encouraged to collaborate, they still face difficulties breaking into established market niches, particularly overseas.  

Research and Academic Institutions  

In spite of Karnataka’s large higher education system, the bulk of its colleges and universities are geared almost exclusively to teaching, with few resources devoted to research. Furthermore, as across the rest of India, the links between industry and academia have been underdeveloped. Notwithstanding this, several institutions in Bangalore are adapting and establishing ties with the IT sector.

90 Interview with S. Sivaguru.  
91 The Network’s special interest group on SMEs is trying to develop a cheaper, quicker equivalent to the Capability Maturity Model (CMM) for local firms. The group aims to develop the methodology and get 200 local SMEs to a CMM level 5 (the highest) by 2007. In addition, the group is piloting a mentoring project, matching small companies with bigger counterparts. At present there are five SMEs being coached by eight mentor firms. SPIN has also collectively represented smaller members for assessment and training on quality standards. Presentation by Aswini Kumar at the SPIN workshop ‘Moving up the value chain’, Bangalore (25/06/2004).  
92 Interview with S. Sivaguru.  
93 Interview with Vivek Kulkarni and Firm D.  
94 Interview with Rajendra Bandi.
The Indian Institute of Science (IISc)

The IISc has long been perceived as a pillar of Bangalore's scientific community. In addition to ranking as one of the world's leading scientific universities, the Institute was heavily involved with the defence and electronics industry through its Department of Computer Science and Automation. However, most contact with the IT sector was regarding hardware, and the Institute did not have the institutional flexibility to effectively deal with the private sector.

The IISc's ability to interface with the private sector dramatically increased with the establishment of the Society for Innovation and Development (SID) in 1991. In the period up to 2002, SID undertook 100 projects worth some US$ 12 million in conjunction with the private sector. Contracting firms included Nokia, General Motors, Honeywell and Microsoft. SID now has eight specialised research centres, two of which are for software development. The Society also facilitates start-ups by faculty members, and has incubated two software firms (SID website).

In spite of its closer links to industry, Heitzman argues that the Institute's real contribution to Bangalore has been the image of city as a learning region with ample scientific expertise rather than any interaction with industry per se (Heitzman 2004:228).

---

95 Interview with Deepak Kumar.
96 Interview with S. Sivaguru. The Institute's software capabilities were bolstered in the late 1980s, through the establishment of two centres - the Supercomputer Education and Research Centre and the Centre for Advanced Scientific Research.
97 The IISc set up the Centre for Scientific and Industrial Consultancy in 1976 to establish links with industry. The Centre provided lectures on technical subjects for local industry, and served as the clearing house for faculty to provide consulting services, primarily in the textile, service, aircraft, and distillery sectors (Heitzman 2004:226). However, constraints still remained to working with the IT sector, in part because the Institute's competencies were more hardware-based. In addition, academics were suspicious of the private sector, had a different perception of intellectual property, and faced onerous barriers to recruiting people from the private sector.
99 One of the firms created the Simputer, a computer that costs less than US$ 200 and is intended to bridge the digital divide.
100 One faculty member that I interviewed took umbrage to this argument, asserting that the IISc had attracted five times as much private sector funding as all the IITs put together. Interview with Mary Mathew, Associate Professor, School of Management, IISc, Bangalore (19/07/2004).
The Indian Institute of Management – Bangalore (IIM-B)

In general, the Indian Institutes of Management have primarily focussed on teaching, rather than research, with faculty having few incentives to interact with industry. While the IIM-B was traditionally one of the bottom-ranked business schools, it began to prioritize research and invest in younger faculty in the early 1990s, as well as approaching large companies such as Siemens and Honeywell to develop custom-made courses.101

At present, in addition to personal research, interaction with the IT industry primarily consists of two initiatives. The first is the Centre for Software Management, established in 1998. The Centre was set up to address a perceived labour market shortage, as IT firms complained that technical personnel lacked management skills. Four IT majors thus sponsored the development of a tailored, part-time MBA for mid-level managers. The Master’s now has some 1,000 applications per year, of which 100 are accepted. Given its favourable response, the IIM-B is looking at developing a specific Master’s for the ITeS sector, as well as expanding recruitment to other cities.102

Under the N.S. Raghavan Centre for Entrepreneurial Learning (NSRCEL), the IIM-B provides a variety of services for SMEs. They include courses on topics such as accessing venture capital, basic management techniques, and quality assurance. In addition, the Centre has an incubator, with six firms (NSRCEL website103). The screening procedures are rigorous and overseen by venture capitalists.104 In addition, the Centre provides access to relevant faculty expertise for interested entrepreneurs.105

The Indian Institute of Information Technology – Bangalore (IIIT-B)

Following GoI guidelines, a group of state governments began setting up Indian Institutes of Information Technology to train high-level software engineers. The IIIT-B was

101 Interviews with Murali Patibandla and Rajendra Bandi.
102 Interview with Rajendra Bandi.
104 In 2004, the Centre was receiving 3-4 enquiries per month, but only had two firms in the incubator.
105 Interview with Mathew Manimala, Chairperson, NSRCEL, IIM-B, Bangalore (13/07/2004).
established with seed money from the KSDIT and leading Bangalore-based firms such as Infosys and Wipro.\(^{106}\)

Since its establishment in late 1999, the IIIT-B has played a crucial role for the IT sector through supplying workers with post-graduate education. Before its creation, the production of students with a Master’s in IT from all the elite Indian Institutes of Technology was 120 per year. The IIIT-B alone now produces 150 per year, dramatically increasing the number of highly skilled workers available for industry.\(^{107}\) The Institute has very good contacts with industry majors who help develop the curriculum and provide internships to students. The Institute’s students are highly sought after, and virtually all have secured jobs before finishing their degrees.\(^{108}\)

The IIIT-B has developed formidable software development capacity in areas such as banking, automotive IT, industrial automation, and telecommunications. The Institute has received funding from Honeywell, Hewlett Packard, and Microsoft and has established links with the Michigan School of Business and the Massachusetts Institute of Technology. The Institute also acts as an incubator for two SMEs, providing low cost facilities and access to the senior management of leading software companies (IIIT-B website\(^{109}\)).

**Other Institutions**

**Wipro**

While IT firms in India are, in general, not good at establishing links or fostering spin-offs, Wipro appears to be an exception. Established in Bangalore in 1981, Wipro has grown to become one of the IT industry’s top three firms and has acquired a reputation for producing spin-offs, as its ex-employees are believed to have established between 100-180 firms since the 1990s.

\(^{106}\) Although the 1997 IT Policy contemplated establishing an IIIT for Bangalore, the real push for its establishment began only after Andra Pradesh inaugurated its own. Interview with Deepak Kumar.

\(^{107}\) Interview with Vivek Kulkarni.

\(^{108}\) Interview with Vignesh Ilavarasan, and personal observations during my fieldwork.

In addition to Bangalore’s dynamism, part of the reason appears to lie with the firm’s internal culture. Employees are rotated through different departments allowing them to gain a global picture of the firm. Workers are encouraged to move into managerial positions quickly and given substantial autonomy and responsibility. These practices then prove valuable preparation for would-be entrepreneurs. Once in the industry, ex-employees are part of an informal network that enables them to exchange information on market trends, venture capital, employees, or potential customers. While Wipro does not actively encourage spin-offs, nor does it seek to establish business relationships with these firms, it maintains a cordial relationship with ex-employees, both to maintain contacts and cultivate potential future managers (Upadhya 2003:19-22).

**Summing Up**

As can be seen, Karnataka has come to house a variety of institutions that have the potential to contribute to the IT industry. However, the bulk of these institutions began to interact with the software sector well after it was established. Perhaps because of this, industry associations offer services largely to established firms – leaving SMEs without a means of collective representation or access to needed services. Similarly, the services that academic institutions offer tend to benefit larger firms, with the capacity to pay for tailored courses or the most qualified labour. Furthermore, with the exception of SPIN, these associations do not encourage their members to pool resources or bid collectively for projects. Thus, like Penang, Karnataka does not appear to have developed a regionally-specific institutional culture that gives its firms a competitive edge.

**Policies**

GoI policies did not alter significantly following the initial liberalization policies of the early 1990s. Thus, the most important policy activity took place at the state level. The GoK moved aggressively to privatise almost half of its state-owned enterprises and reform the electricity sector, as well as reducing investment incentives to free up resources for infrastructure provision (Businessworld 28/10/2002, Rajeev 2004:6, Gayithri 2003:230).
The fiscal deficit declined markedly, falling from a high of 5.1 per cent of GRP in 2001 to 2.7 per cent in 2004-05 (Twelfth Finance Commission website). Under Krishna, the GoK moved rapidly to revitalize the state’s policy framework, releasing the Millenium IT Policy in 2000. Unlike its predecessor, which had been formulated by a bureaucratic team, this Policy was formulated with feedback from the business community and focussed more clearly on providing human resources for industry, rather than incentives. While tax holidays were kept for new IT-related investments, the GoK did not follow other states in subsidizing the creation of jobs. The Policy also sought to promote a wider, more inclusive vision of IT which would benefit rural areas and poorer communities (KSDIT 2000:2-10).

These measures were followed by the 2001 New Industrial Policy. The Policy stressed deregulating the business environment, improving the state’s infrastructure, and bolstering the state’s institutional support for technology upgrading. Echoing its predecessor, the 2001 Policy downplayed the importance of incentives in attracting investment (Department of Industries and Commerce 2001:5, The Hindu 25/06/2001).

**Infrastructure**

Regarding infrastructure, the GoK adopted a two-pronged strategy. First, it sought to restrict its commitments and investments to specific geographic areas, giving renewed emphasis to projects demanded by the IT sector. Second, it promoted secondary cities as a way of minimizing Bangalore’s ever-increasing diseconomies of scale.

The GoK committed to investing US$ 4 billion in upgrading the state’s infrastructure. Borrowing from Malaysia’s Multimedia Super-corridor, the GoK promoted an ‘IT corridor’ where firms would enjoy industry-specific infrastructure such as better roads, more regular

---

111 ‘Incentives are negligible in the overall running costs of these firms. They are here because of the manpower, and did not come because of the incentives.’ Interview with Vivek Kulkarni. Two of my interviewees mentioned that Andra Pradesh had subsidized wages to attract industry majors.
112 Such as promoting software programs in Kannada, encouraging more e-governance, allowing farmers to find out prices for their crops, and decentralising government services.
electricity, and dedicated water supply. However, while progress has been made on parts of the Corridor, senior officials have been accused of profiteering from real estate speculation (The Hindu 22/07/2001, Frontline 17/01/2004).

The GoK also reinvested its energies in building an international airport in Bangalore. After detailed negotiations with a variety of stakeholders, a site was chosen and construction began in July 2005. The airport is expected to be completed by 2008. The Metro Rail project has also been revived, with construction beginning in 2005 and expected completion in 2009 (Karnataka.com website).

The GoK also began to promote secondary cities such as Mysore, Manipal, Mangalore, and Hubli, stressing these cities' less congested roads, good educational infrastructure, and untapped stocks of skilled workers.

**Investment Promotion**

The GoK streamlined the state's investment process with the Industries Facilitation Act in 2002. The Act gives the investor liaison agency, Karnataka Udyog Mitra (KUM), the power to obtain all state-level permits for investors to set up operations (Dasgupta and Liu 2005). KUM has three officials, who are joined by seven others from different state-level agencies. They vet each application before it is sent off to different departments for approval. This is said to bring down the entire approval process to a mere 15 days.

---

113 The Corridor runs from the International Technology Park in the north of the city to Electronics City in the south, by way of the airport (Nair 2000:1, Businessworld 26/02/2001).
114 Interview with a GoK official, Bangalore (August 2004).
116 Presentation by Shankaralinga Gowda, Principal Secretary, KSDIT, GoK, at the IIM-B Conference 'Cross-border Dynamics in India's IT Sector', Bangalore (2/07/2004), and an interview with Harish Gowda, CEO, KIADB, Bangalore (04/08/2004). A key pillar of this policy is the Bangalore-Mysore Infrastructure Corridor, which aims to link the state's two biggest cities by a six-lane expressway. After many delays, construction on the 140 km expressway began in 2003. At present, four lanes are operational, but as with the Infrastructure Corridor, senior ministers have been implicated in real estate scams (Frontline 03/06/2005, Deccan Herald 18/12/2004).
117 Interview with Gurunath Kulkarni and Mohamed Iqbal, Executive Officer, KUM, Bangalore (22/06/2004).
Human Resources

The Millenium IT Policy envisaged teaching IT skills in all engineering colleges, 100 polytechnics, 150 industrial training institutes, and 300 undergraduate colleges (KSDIT 2000:4). This was bolstered by the Board for IT Education Standards (BITES). BITES tracks the performance of 115 engineering colleges in the state, ranking their test results and graduate placement rates. These results are then published to help industry recruit workers and stimulate competition between colleges. BITES also trains engineers without a background in IT to teach basic software courses, freeing up faculty with a more technical background to teach more advanced courses. This has increased the state’s annual output of software engineers from 17,000 to 22,000 a year.

Summing Up

Thus, after 1999, the GoK’s policy framework became more responsive to the IT industry. The IT industry became the main beneficiary of policies, even if their effectiveness was constrained by the limitations of the state’s political realities. Where possible, the GoK sought to improve infrastructure and regulate the quality of the state’s human resources.

Outcomes

The period 1999-2004 was characterised by technocratic administration and more IT-friendly policies. During this time, the GoK cemented its reputation as one of the country’s more open, investor-friendly, and reform-oriented states. However, the state government also had to confront rent-seeking and mediocre institutional capabilities that limited the state’s attractiveness for firms.

---

118 It is likely that stimulating competition between colleges is the most important function, as most firms administer their own tests to gauge the quality of candidates. Interviews with S. Sivaguru, Preethi Thomas, Consultant – Staffing Solutions, Ma Foi Management Consultants, Bangalore (17/07/2004) and Kavitha Reddy, Assistant Vice-President, TeamLease, Bangalore (07/07/2004).
119 Interview with R. Panchaksharaiah, Administrative Officer, BITES, Bangalore (18/06/2004).
120 Interview with Jawaid Akhtar.
The Investment Climate

A 2001 survey of more than 2,000 industrialists gave Karnataka a moderately positive ranking – 6th out of 19 major states, ahead of Tamil Nadu and Maharashtra, but behind Andra Pradesh. Karnataka fared well in terms of its openness to reform (3rd) and responsiveness to industry needs (6th) (Indicus Analytics 2004:18).

Other surveys echo these findings. On one hand, the GoK’s regulatory burden seems comparatively low. A World Bank survey found that firms in Karnataka are able to start operations more quickly than anywhere else in the country.121 Firms in Karnataka were also subject to relatively few government inspections, and senior management had to spend relatively little work time to ensure compliance with regulations (World Bank 2004:24). As a result, Karnataka has acquired a reputation as a relatively efficient state for investors to work with.122

However, Karnataka faces serious corruption issues. While the BATF helped significantly reduce incidents of corruption in a range of agencies, cross-state surveys indicate that Karnataka lags behind its competitors. The Indicus survey ranked Karnataka 15th out of 18 states, and a full 66 per cent of respondents in a World Bank survey listed corruption as a major or severe obstacle – the highest of any major state (Indicus Analytics 2004:18, World Bank 2004:28).

Infrastructure

The GoK has not been able to address the state’s pressing infrastructural issues. Despite the concentration of public resources in defined ‘corridors’ and attempts to disperse the industry to secondary cities, the state’s infrastructure is still mediocre. Sixty-one percent of

121 This is still 57 days, compared with 89 days in Maharashtra (World Bank 2004:32).
122 Interviews with N. Muralidharan, T. Ramappa, Deepak Kumar, S. Sunath, and Roland Haas, Managing Director, DaimlerChrysler, Bangalore (03/08/2004).
respondents on the World Bank survey stated that infrastructure was a major obstacle to doing business in Karnataka, the highest across all states (World Bank 2004:31).\textsuperscript{123}

While software firms complain about the lack of infrastructure in Bangalore, infrastructure in other cities in Karnataka is worse, with fewer roads, and no direct international flights. This has impeded significant investments outside Bangalore, with the exception of Mysore (Frontline 31/01/2004, Deccan Herald 24/06/2004). Some IT majors that have located facilities outside Bangalore have had to downgrade them or close them down due to infrastructural problems.\textsuperscript{124}

**Access to Finance**

The GoK has moved proactively to ease credit constraints, and the state has one of the most developed banking sectors in the country (Dhingra and Verma 2005:26). In addition to GoK’s venture capital fund, many leading VC firms are located in Bangalore (Dossani and Kenney 2002:244). However, lending still tends to be conservative, oriented at lower-end service provision and most entrepreneurs rely on personal savings to meet business needs (Vijayabaskar and Krishnaswamy 2004:197).\textsuperscript{125} In spite of this, VC firms have played a crucial role in proving smaller firms with technical and business advice (Upadhya 2003:11).

**Human Resources**

Regarding human resources, shortages at the top end are beginning to appear. The software industry’s requirements are escalating and more skilled and experienced workers are

\textsuperscript{123} There is an average of 26 power outages and insufficient water 11 times a month in Karnataka, significantly above states like Andra Pradesh, and Maharashtra (Dingra and Verma 2005:15).

\textsuperscript{124} Interview with N. Muralidharan. In addition, increasing disparities in service provision in urban areas highlighted the negative impact of ‘selective’ investment. Half of Bangalore’s population lives in some 700 slums that do not receive adequate public investments. The differential in investment between prime IT areas and working class neighbourhoods is 40:1. When high-cost public investments like expressways are added in, the differential rises to 60:1 (Frontline 22/10/2005).

\textsuperscript{125} Interview with Vivek Anjana, Visiting Fellow, Finance and Control Area, IIM-B, Bangalore (21/05/2004) and presentation by Simon Commander, Professor, London School of Business, at the IIM-B Conference ‘Cross-border Dynamics in India’s IT Sector’, Bangalore (02/07/2004).
sought. In particular those with postgraduate degrees and some level of management training are in demand. This has contributed to widespread poaching between firms, and attrition levels are approximately 40 per cent (The Economist 23/04/2005).

However, this is a country-wide phenomenon, and Karnataka is comparatively better off. Due to the quantity of firms present in Bangalore and the state’s education system, firms are able to tap a very deep talent pool. In addition, firms in Bangalore have found it easier to attract and retain talent. Thus, in 2003, it took firms in Karnataka only 3.4 days to fill a skilled vacancy, relative to Tamil Nadu’s 3.5, Andra Pradesh’s 4.5, and Maharashtra’s 5.7 (Dhingra and Verma 2005:24).

Notwithstanding this, wage levels in Bangalore are some 17 per cent higher than the national average, as the city’s rapid growth and influx of MNCs has meant rising wages (Deccan Herald 02/08/2004). While the city will continue to attract investment from MNCs, smaller firms are beginning to move out or relocate less skill-intensive tasks.

The IT Sector

Overall Growth

In spite of Karnataka’s growing diseconomies of scale, it appears that the industry’s window of locational opportunity has closed – in its favour. As discussed in Chapter 6, the state’s software sector continued to expand after 1999, and it remained the country’s leading IT centre. The number of firms registered with STPI - Bangalore grew from 780 in 1999-2000 to more than 1,500 in 2004-05, generating US$ 6.3 billion in exports. Thus, in 2005, Karnataka housed the biggest concentration of software firms, headquarters, and

---

126 Interview with Preethi Thomas.
127 In 2003, Microsoft advertised for 800 positions and received 87,000 applications. Interview with Vivek Kulkarni. According to one industry observer, ‘Bangalore still has the largest pool. The South is cheaper and you get more applications per job. While the quality is bad, the choice is so good you will get something’, interview with Anand Parthasarathy.
128 According to one IT staffing company ‘The development of the depth of the talent pool is due to the number of companies relocating here, the brand name of Bangalore, and the weather. Also, people come from other cities and less Bangaloreans relocate’. Interview with Preethi Thomas.
129 Interview with the CEO of Firm F, Bangalore (17/07/2004).
R&D centres in the country, and averaged four new investments a week (KSDIT website\textsuperscript{130}).

Overall, Karnataka’s economy continued to grow handsomely at an average 9.4 per cent p.a. over 1999-2005, with the IT sector accounting for about a fifth of this growth.\textsuperscript{131} Despite its rapid growth, Karnataka remained a mid-ranking state in human development terms, with slightly higher than average poverty (World Bank 2005:4).

However, did Karnataka’s institutional and policy context create a ‘regional economic commons’ that provided greater opportunities for collaborative learning and innovation? In other words, did local institutions enable firms to acquire greater capabilities or foster competition on the basis of quality rather than price?

\textit{Attaining Sectoral Transformation?}

There is some evidence of this. Firms in Bangalore are acutely aware of the need for quality certification. ISO 9000 certification and other quality control processes are essentially obligatory for established firms.\textsuperscript{132} Of the 56 Indian firms who have obtained the highest software capability certification, 32 are based in Bangalore (STPI website\textsuperscript{133}).

Furthermore, as mentioned in Chapter 6, the composition of companies in Bangalore is changing, away from an exclusive reliance on software service firms to a more diversified selection of expertise – including communication, systems, and application software (Table 6.7). Furthermore, Bangalore-based finns are acquiring niche expertise in specific market segments, such as finance, animation, and telecommunications.

Bangalore now hosts more than 450 MNCs with more than 100 R&D centres, many of which employ thousands of workers and undertake mission-critical tasks. In addition, many MNCs are now moving beyond outsourcing specific components to conceptualizing and

\textsuperscript{130} http://www.bangaloreit.in, accessed 04/03/2006.


\textsuperscript{132} Interviews with R. Remali and Krishnan Puthucode.

\textsuperscript{133} http://www.blr.stpi.in/index.htm, accessed 04/03/2006.
designing entire products in Bangalore. Karnataka's deepening technical capabilities have also attracted hardware-producing firms such as Motorola, IBM, and Texas Instruments (STPI website\textsuperscript{134}).

While the presence of these firms bodes well in terms of potential spill-overs for local firms, perhaps the most encouraging signal is that Bangalore now has a cluster of local firms that specialise in designing embedded systems for microchips. There are estimated to be at least 100 Bangalore-based firms in this market niche, signifying a degree of deepening capabilities (Parthasarathy and Aoyama 2006:12). Other firms are developing expertise in market segments such as digital signal processing and system on a chip (Athreye 2003:26).

\textit{Or Competition on Price?}

However, in spite of these positive indications, available evidence suggests that most Karnataka-based firms are not particularly innovative, have not developed a great deal of domain expertise, and few have formed networks or begun to work collaboratively.

The bulk of firms are still service providers. Some 95 per cent of India's exports consist of less sophisticated software services, rather than products or high-end consulting services and it is only recently that bigger firms have been able to win more sophisticated and value-added service provision contracts (Athreye 2005:32). Furthermore, very few companies successfully develop and market products (Dossani and Kenney 2002:237). The majority of Bangalore-based firms export their services and thus have well-developed linkages overseas. However, these links are not with other local firms, making the diffusion of tacit knowledge difficult (Vijayabaskar and Krishnaswamy 2004:187).

Furthermore, diversification among firms is 'weak', with only marginal differences in expertise across industry verticals. Thus, low barriers to entry make firms leery of sharing technical information, which is compounded by restrictive intellectual property clauses. Therefore, businesses diversify by adding upstream and downstream steps to their activities rather than subcontracting (Lema 2005:12).

\textsuperscript{134} http://www.blr.stpi.in/index.htm, accessed 04/03/2006.
Competition between firms is fierce and very little collaboration and speciation is emerging. What inter-firm collaboration there is, is restricted to supplying personnel during periods of peak demand. 135 Other, less business-critical tasks such as financial and human resource management or outsourcing of back-office operations may also be contracted to local firms (Upadhya 2003:29).

There are very few instances of Bangalore-based firms bidding jointly for projects. Where this has occurred, it has been between industry majors, such as Wipro, Infosys, and TCS (Lema 2005:14). In particular, larger firms see smaller firms as potential competition and are reluctant to work with them, instead preferring to take them over (Chapter 6). Spin-offs are also not encouraged. 136 The recent growth of Bangalore’s IT cluster has largely been due to overseas investments. In 2003-04 and 2004-05, two thirds of new firms were owned by multinationals, with local SMEs accounting for 26 per cent and 31 per cent of the total respectively (KSDIT website 137).

Karnataka’s formal networks such as NASSCOM, SPIN, and TiE have not been helpful at fostering collaboration. NASSCOM and TiE are geared more towards larger, established firms. NASSCOM has confined itself to lobbying at the national level for IT-related issues. TiE, in turn, has been geared to linking up angel investors based in the US with local firms. While positive, these networks are outwardly oriented, and do not contribute to local ‘institutional thickness’ or spillovers. Similarly, while SPIN helps local firms deepen their capabilities, it does not match-make. While there are some informal networks, such as those found among ex-Wipro employees, they are restricted to information-sharing. Thus, there is no evidence of smaller firms joining together to bid for projects, develop products jointly, or form consortia to leverage different capabilities.

Furthermore, aside from incentives, infrastructure, and some marketing, the GoK has not attempted to address market failures facing its firms. The former IT Secretary states that the

135 Interviews with N. Muralidharan and Kavitha Reddy.
136 The software industry does not function as an ecosystem or cluster, with tiered competition. The cases where people from an established company leave is proceeded by the them taking part of the customer base... so they are seen as competition’. Interview with N. Dayasindhu.
GoK ‘should not interfere with market forces’. Similarly, the current IT Director states that while the IT industry needs to climb the value chain, ‘it is not our job to help foster greater value-added activity.’

**Summing Up**

The Krishna administration, in power for most of the post-1999 period, provided an unusual amount of stability to the economy in general and the IT sector in particular. The IT sector grew quickly and assumed an increasingly visible role in the public sphere and policymaking. The GoK sought to lift the regulatory burden on firms and target resources at specific types of infrastructure, as well as seeking to develop the state’s human resource base. These closer relations and more proactive policymaking were made possible due to high-level political will, and some measure of ‘autonomy’ in the Department of Information Technology along with ‘embeddedness’ with the software sector. Thus, the state government eventually displayed some ‘developmental’ elements.

However, the Krishna administration was limited by available resources and compromised government institutions. The GoK simply did not have the resources or institutional capacity to provide the roads and electricity demanded. It was also circumscribed by an increasingly vocal electorate, who saw little of benefit in an urban-centred growth model. Thus, the GoK had to contend with a more hostile political environment and bigger resource constraints. That said, neither did it display the PDC’s entrepreneurial spirit and drive to overcome financial limitations.

The state’s institutional context was not of immense help to the sector’s development. Relevant academic organisations and industry associations were created after the industry was established, and their activities were, in general, limited to providing services to expressed needs, rather than fostering innovation or inter-firm collaboration.

This comparatively advantageous position was undercut in 2004, with Congress’s defeat and subsequent alliance with Janata Dal. The IT industry rapidly lost a good deal of

---

138 Interview with Vivek Kulkarni.
political support and its access to policymakers. That said, the IT sector’s visible economic clout meant that it could not be completely discounted.

Despite diseconomies of scale and expressions of dissatisfaction from industry leaders, Karnataka’s IT sector continued to expand after 1999. At the end of 2005, Karnataka’s IT sector was the biggest and most technologically advanced in the country, strongly suggesting the importance of agglomeration economies and the state’s human resource base in propelling the sector’s growth, rather than determined state government initiative.

Conclusions

This case study has sought to uncover how Karnataka’s political, institutional, and policy context fostered the growth of the state’s IT industry. In contrast to the Penang case study, it would seem that Karnataka’s success can be more satisfactorily explained by a Neoclassical economic approach.

Following this reasoning, India’s post-1991 regulatory environment, coupled with Karnataka’s unique factor endowments and key infrastructural investments, enabled its software sector to take off. Traditional Marshallian economics adds value by highlighting the role of the cluster’s potential traded interdependencies in attracting more firms, in turn generating agglomeration economies and enabling the sector to grow more quickly than other rival clusters.

Notwithstanding this, the framework advanced in Chapter Two is useful for understanding how the state’s political and institutional context shaped the development of Karnataka’s IT sector.

The framework is of greatest utility in understanding Karnataka’s development up to and immediately after independence, as the province’s development was the epitome of state-led growth. The Mysorean state articulated a vision for development and negotiated a tacit

139 Interview with Jawaid Akhtar.
pact with local elites, providing a stable, if geographically-limited business climate. It developed a core of high quality institutions to foster industrialization, including a remarkably modern pilot agency. This institutional capacity, coupled with a progressive policy framework, led to the state’s well-developed physical and social infrastructure.

After independence, the state government lost its autonomy, becoming beholden to conservative elements. Unlike in Penang, investment was no longer targeted to industry and Karnataka gradually began to lose its leading position relative to other states. Fortuitously, this period of conservatism was accompanied by the liberalisation of its education sector, which in turn enabled it to develop its human resource base.

However, after 1972, the Karnataka’s political and institutional environment evolved in unexpected ways. The province’s political context changed, away from an elite-oriented model of development, toward a more inclusive, consensual style of government. While this did not bode well for a well-directed state-led model of growth à la Penang, it also preempted the more conflictive and exclusive style of government seen elsewhere in India. However, this political change was accompanied by the deterioration of state institutions, further hampering the possibility of decisive and helpful state action.

Notwithstanding these developments, Karnataka’s prior investments in infrastructure and human resources enabled it to benefit from central government largesse in the form of high-end scientific and defence institutions, which generated demand for skilled labour and supplier firms. This core of firms, coupled with abundant human resources and relatively good infrastructure, meant that even in the absence of good quality institutions, Karnataka was well poised to compete for industry leadership.

At the political level, unlike Penang and its electronics sector, the software sector was not a priority for the GoK until the late 1990s - after it was relatively established. The policy agenda of the GoK since independence seems more reminiscent of Kohli’s ‘multi-class state’, where attempts are made to appease a range of constituencies. With one brief interlude, relationships between the state and industry were not close – instead, economic considerations were consistently subsumed to electoral and partisan considerations.
However, Krishna’s attempt to become ‘business-friendly’ was quickly cut short by an irate rural electorate.

At the institutional level, while there was a short-lived alliance between the state and the IT sector after 1999, the state was certainly not in the driving seat. Rather, the impression was of the state as a laggard struggling to meet long-neglected needs. The Bangalore Action Task Force along with the Department of IT under Kulkarni, stand out as ‘pockets of efficiency’, with considerable autonomy and good ties to industry. However, given their tardiness, these initiatives were probably more helpful in bolstering the state’s image than in shaping the sector’s development.

Similarly, government agencies, industry associations, and academic institutions in Karnataka emerged rather belatedly. While the state’s increasing ‘institutional thickness’ bodes well for the future and demonstrates that institutions can evolve positively, it is noteworthy that – as in Penang – inter-firm collaboration and collective efficiency are almost non-existent. To date, most firms are still externally oriented and linkages are few and far between. That said, unlike Penang, Karnataka’s window of opportunity still appears to be open.

At the policy level, the Government of Karnataka struggled to provide an ‘enabling environment’ for industry. While the state was able to provide a relatively responsive and de-regulated environment in the wake of the 1991 reforms, it was unable to significantly improve its infrastructure or combat corruption. While it attempted to market the local IT sector and regulate the quality of human resources, the GoK was in no position to promote a ‘regional economic commons’ or foster learning and innovation. Policy-makers and entrepreneurs alike seemed all too aware of the state’s limited capacities. That said, greater competition from neighbouring states had a galvanizing effect on policy-making and served to limit levels of state ‘incapacity’.

This chapter and its two predecessors have looked at the structure and capabilities of Karnataka’s software sector, and then gone on to analyse how national and sub-national institutional regimes and policy frameworks shaped the sector’s potential for economic
transformation. The next and final chapter will draw out the theoretical and policy implications emerging from the cases of Penang and Karnataka.
CHAPTER 9
Conclusions

Introduction

This thesis has sought to explore the ability of sub-national state institutions to effectively promote economic transformation. In order to do this, it has looked at how two dynamic regional economies were influenced by their national and sub-national institutional regimes and policy frameworks.

This concluding chapter will first briefly summarise the thesis’ theoretical motivation and review the two regions’ progress towards attaining economic transformation. From there, it will discuss the theoretical and policy implications that can be drawn from a comparison of Malaysia and India on one hand and Penang and Karnataka on the other. Finally, the thesis’ arguments and contributions to knowledge will be reviewed.

The Theoretical Framework

Chapter Two developed a theoretical framework through bringing together two separate bodies of work, namely institutional political economy and institutional economic geography. The chapter argued that economic performance is driven by market institutions which, in turn, are crucially influenced by their interaction with state and other social institutions. In addition, economic activity has a spatial dimension as market performance at the local level can be similarly shaped by its surrounding institutional context.

Chapter Two then analysed how cases of successful economic transformation – meaning the transition from an agricultural to an industrial or service-based economy or, in the case of a specific sector, sustainable progression up the value chain of activities – were shaped by specific political-institutional arrangements. In particular, the characteristics of the Developmental State were set out as the key form of institutional arrangements of interest for this thesis. The central components were taken to include: a high degree of bureaucratic autonomy and capacity; the prioritization of
economic transformation; and collaboration with the private sector towards attaining this end.

However, while of utility for understanding national-level trajectories, this thesis argued that the DS framework, when kept at the national level, is not able to explain differences in economic performance between regions within a country. Therefore, the Developmental State (DS) framework was applied to the sub-national level, where it was argued that, as with national-level institutions, the effectiveness of local state institutions for economic transformation is determined by the quality of the state bureaucracy, its priorities, and its interaction with the private sector.

In addition, the thesis extended the DS framework through highlighting the role of private sector associations, interaction between state agencies and levels of government, and the wider political context in affecting the ability of state institutions to promote economic transformation.

The chapter then built up the case of how proactive state institutions can help foster economic transformation through implementing a range of market-complementing and 'developmental' policies. While the portfolio of policies available to national and sub-national states does not differ greatly, the former's greater access to resources and the latter's greater access to information may make one level of governance more apt than another to implement a specific policy.

The Sectors

Chapters Three and Six laid out the structure of Penang's electronics and Karnataka's software sectors and the challenges facing them through bringing together existing literature and new information from a range of primary sources, including key informant interviews.

The chapters argued that both sectors have a comparable hierarchy of tasks and have followed a similar logic in their geographic expansion. The more elementary and routine tasks were moved from developed economies to offshore sites first, and over time more high-end tasks were moved to those locations possessing more sophisticated
capabilities. In the case of the electronics sector, the first production tasks to be relocated were the simpler tasks of assembly and testing. Regarding software services, the less elaborate testing and coding phases were outsourced ahead of more sophisticated tasks.

Penang and Karnataka have both emerged as industry leaders in their respective countries, winning out over other competing provinces. Neither province is exclusively reliant on the simple provision of low-cost labour, and both are climbing their respective value chains by acquiring more capabilities.

Relative to its domestic competitors, Penang hosts the biggest group of electronics MNCs, and its cluster of supplier firms is the largest, most diversified, and has the most sophisticated inter-firm division of labour. Penang-based operations are also beginning to carry out design and development work, which – while not leading-edge R&D – still requires considerable technological capabilities.

Likewise, Karnataka has emerged as India’s software services leader. The province hosts the biggest agglomeration of software firms, headquarters, and R&D centres in the country. Bangalore-based firms are moving away from simple onsite work to more sophisticated offshore operations and are developing specialized expertise in technologically-demanding market segments.

However, in spite of their performance relative to local competitors, neither cluster has successfully attained full sectoral transformation, as neither Penang nor Karnataka has been able to carve out a unique market niche or completely move away from lower-value and more labour-intensive tasks. In particular, new industry information shows that Penang is losing investment as a result of its direct competition on price with China. That said, primary sources and interviews show that, in spite of competition from other states and increasing diseconomies of scale, Karnataka is expanding into new and higher-skill segments of the value chain.

The electronics and software industries are at different stages of development. The electronics industry is mature and has a well-established international division of labour. Firms are used to leveraging geographically-dispersed capabilities and, with increasing levels of competition, locations that do not offer unique capabilities are being left out of
firm networks. Conversely, the software sector is young and growing quickly. It faces enormous labour shortages and is only beginning to internationalize. Thus, Penang’s limited success at economic transformation may signal its demise in this new environment. In contrast, Karnataka’s window of opportunity to attain such a transformation is still open.

Theoretical Implications

What, then, are the theoretical implications to be drawn from an analysis of Malaysia and India on one hand, and Penang and Karnataka on the other? As in the previous chapters, this section will first look at the national-level states to provide the general context before turning to their sub-national counterparts.

The Malaysian and Indian States

Chapters Four and Seven drew on secondary material looked at the state and industrial policy framework in Malaysia and India in order to establish the national context within which Penang and Karnataka’s sub-national states operate. In so doing, these chapters applied the DS framework through analyzing the capabilities and priorities of each country’s state bureaucracy and its ties to the private sector. Furthermore, these chapters evaluated the industrial policy framework and federal-state government relations in each country.

Chapter Four argued that the Malaysian state departed significantly from the ‘developmental’ ideal. While the Malaysian state was capable and autonomous at independence, its institutional integrity declined over time as patronage networks proliferated between senior government officials, party members, and select businessmen. Furthermore, the state did not prioritize economic transformation, but rather pursued the inter-ethnic redistribution of wealth. In doing so, it established unproductive ties with one section of the private sector, while neglecting the needs of genuine entrepreneurs. Only when this strategy was no longer economically viable did the state reconsider its priorities.
Chapter Seven contended that the Indian state similarly did not attain the 'developmental' ideal. As with Malaysia, India had a competent state apparatus that lost integrity and capacity due to its politicisation and the proliferation of rent-seeking. The state's drive for economic transformation was diluted by simultaneous commitments to socialism, democracy, and state-led industrialization as well as the country's vast array of interest groups. In addition to rent-seeking, excessive regulation and inadequate incentives stifled the private sector's entrepreneurial capabilities. Only after the state prioritised economic growth and allied itself with the private sector did the economy regain momentum.

Thus, applying the DS framework to national-level institutions in Malaysia and India aided in understanding why neither country was able to attain full potential economic transformation. In addition, the 'pocket of efficiency' concept was useful for understanding why a country could excel in a particular economic sector and not another. Therefore Chapter Seven argued that, while the Indian state as a whole was not 'developmental', one specific agency, the Department of Electronics (DoE), was able to approximate a constructive mix of capacity, autonomy, and communication with the private sector. Thus, the DoE through its technical expertise, absence of patronage, and ties to software entrepreneurs was able to enact enabling legislation well in advance of other government agencies.

**Extending the Framework**

While useful, the DS framework needs to be expanded in various ways, as argued in Chapter Two.

Although state institutions are pivotal in fostering economic transformation, private sector organisations can also be influential through lobbying for specific legislation and addressing coordination externalities among firms. Thus, in India, associations like CII and NASSCOM played crucial roles in enabling communication between the state and private sector, as well as pushing for de-regulation and crucial investments in infrastructure. Conversely, in Malaysia, the state's pro-business drift was hampered by the lack of a suitable and effective private sector counterpart. The state's reluctance to
strengthen existing intermediate associations meant that it was unable to access firm-level information to feed into policy-making.

Furthermore, while communication or ‘embeddedness’ with the private sector is an important consideration, this needs to be clarified further – as even within a specific industry – the private sector is not uniform. As seen in Malaysia, the state was overly ‘embedded’ with the Bumiputera segment of the private sector to the complete neglect of Chinese capital. Conversely, in India, the Department of Electronics was able to establish a productive mix of communication and autonomy with an entirely new class of entrepreneurs.

In addition, although it is important for the state to communicate with the private sector and be able to enforce performance requirements, it is equally vital for there to be communication and accountability between state institutions. As seen in the case of India, the Planning Commission’s inability to enforce performance targets on line ministries was as debilitating as its inability to impose them on firms. The ensuing lack of coordination and discipline among relevant agencies signified the demise of effective state stewardship of the economy.

Lastly, the establishment of economic growth and transformation as a political priority cannot be seen uniquely as the result of intra-elite negotiations. The wider political context can and does influence what goals are set and how they are pursued. As seen in Malaysia in 1969, despite good economic growth, intra-elite consociational governance coupled with laissez faire economic policies was decisively rejected at the grass-roots level. Similarly, despite good growth rates in India from 1999-2004, voters from rural areas rejected what they perceived as an excessive urban bias in policy-making, leading to a reconfiguration of the state’s role and priorities.

Thus, merely analysing intra-elite negotiations does not shed light on why developmental goals are pursued above other considerations. In the case of Malaysia, intra-elite negotiations led to the pursuit of a goal – the inter-ethnic redistribution of wealth – that openly endangered the country’s economic viability. In India, similar negotiations led to the pursuit of a variety of often conflicting objectives. It was only when both countries faced the possibility of financial ruin, and consequently electoral losses, that policy priorities were re-ordered.
Therefore, while useful in discerning how political and institutional arrangements enable economic growth and transformation, the DS framework does need to be extended through factoring in: greater diversity and agency among private sector actors; the importance of intra-state relations; and the role of the wider political context in shaping state priorities. In addition, as the next section will show, if kept at the national level, the framework does not aid in understanding why economic performance varies between different regions of a country.

**Sub-national Institutions**

This thesis, through analyzing material from a wide range of primary sources, provided the first theoretical application of the DS framework to Penang and Karnataka. It demonstrated that, when taken down to the sub-national level, the DS framework was also useful in analyzing the role of local state institutions in fostering economic transformation.

Chapter Five argued that the Penang State Government closely resembled the DS ideal during the 1970s and 1980s. The state government, through the Penang Development Corporation, had a pilot agency that was capable, autonomous, established close links with the local private sector, and pursued economic growth and transformation relentlessly. However, over time, the PDC came to lose autonomy and bureaucratic capacity, and its communication with local firms died. Penang’s electronics cluster subsequently stagnated, as local firms were unable to cope with increasing levels of competition alone.

Chapter Seven argued that the Government of Karnataka did not approach the DS ideal. Like its national counterpart, the sub-national state was hampered by low levels of institutional integrity and capacity, and its commitment to economic transformation was diluted by allegiances to many interest groups. Once the software sector was large enough to demand public resources, the state government changed its priorities.

For a brief period between 1999 and 2003, the state government had a ‘pocket of efficiency’ in the Karnataka State Department of IT. The Department was capable,
efficient, and established communication with software entrepreneurs. However, this communication happened once the software sector was established and was ultimately short-lived. At present, while the state’s politically mobilized rural population precludes single-minded support for the software sector, the sector’s growing economic clout places it in a position to demand some level of commitment.

As this thesis has demonstrated, the DS framework is useful for understanding the interaction between each sub-national state and the specific sector in question. However, as with their national-level equivalents, this thesis shows that the framework needs to be extended in various ways.

**Extending the Framework**

The case studies show that the relationship between the sub-national state and private sector is also vital to economic transformation and needs to be developed more fully. Both Penang and Karnataka tried at different points in time to start and maintain communication with the private sector. However, in both cases, the state governments were inevitably drawn to MNCs and larger domestic companies – to the exclusion of smaller firms. In spite of this, the most productive period for Penang’s electronics sector was precisely when the state government worked in collaboration with local, small firms to boost their capabilities to attract and retain increasingly mobile foreign investment. In Karnataka’s case, small firms have been neglected – to the detriment of the industry’s diversity and depth. Thus, while the concept of ‘embeddedness’ is useful, it is important to disaggregate the private sector into different groups with differing needs and agendas.

While the Indian case demonstrated the need to analyse relationships between state institutions, the two case studies show the importance of the interaction between levels of governance. Previous work on sub-national states stressed the importance of good relations between the federal and state governments. In contrast, these case studies show different results, as the Penang State Government and the Government of Karnataka did not always enjoy good relations with their national-level counterparts. Indeed, conflictual relations between federal and state governments did not preclude effective policy-making.
Rather, what was important was the state governments' autonomy from excessive federal government oversight and their freedom to pursue local-level priorities. In the case of Penang, the state government played a pivotal role in buffering local Chinese entrepreneurs from ethnic tensions at the national level. As its autonomy from federal government control decreased, the state government's ability to support local entrepreneurs similarly declined. Conversely, the Government of Karnataka's drive to foster the software sector increased markedly after the 1991 decentralization reforms.

In addition to autonomy from higher levels of government, the success of the sub-national states was also influenced by their ability to access alternative sources of capital and technology. Both Penang and Karnataka were affected by federal government priorities for investment in infrastructure, education, and state-owned enterprises. Penang, for its part, was bypassed due to an obvious federal preference for Kuala Lumpur. Bangalore benefited from the establishment of high-end research institutions, but Karnataka as a whole was often passed over in favour of other states. However, being able to court international investment was pivotal first for Penang and later Karnataka. As sub-national states have fewer resources to invest in lumpy high-end infrastructure and research institutions, foreign capital may provide an alternative avenue of acquiring them.

The case studies also shed light on the question of why 'developmental' goals emerge at the sub-national level. Penang's dramatic economic decline after independence set the stage for a political change and renewed commitment to economic growth. With regard to Karnataka, the challenge for supremacy posed by neighbouring states caused bureaucrats and policymakers to invest considerable political and financial capital in the software sector. Thus, the prospect of economic and, thereby, political ruin prompted a greater and more genuine commitment to economic growth and transformation.

Furthermore, the case studies demonstrate the importance of the wider political context in enabling sub-national states to formulate and retain their commitment to economic transformation. Penang was able, in the wake of the 1969 riots, to foster the growth of a sector that was predominantly foreign and Chinese-owned through ensuring that the fruits of growth were distributed to other ethnic groups. In contrast, the Government of Karnataka was unable to convince the rural electorate of the benefits to be derived from...
a software-led economic boom. The province’s mobilized rural voters promptly undermined the incipient alliance between the sub-national state and the software sector.

Lastly, the comparison of Penang and Karnataka shows that institutions change over time, sometimes for the better and other times for the worse. Thus, ‘developmental combinations’ are not permanent states of being, but rather are temporary. While such combinations generate positive economic outcomes, there is no guarantee that this will become the status quo. The case of Penang showed how, over time, the institutional underpinnings of its economic transformation began to unravel, despite visible results. Conversely, Karnataka moved in a developmental direction over time, despite considerable political obstacles.

Having looked at national-level institutions on one hand and sub-national institutions on the other, it is pertinent to consider what can also be learned about their interaction.

**Interaction between Levels of Governance**

Unlike previous work which looked at sub-national states as an intervening variable between the national-level state and the economy, this thesis has approached them as agents in their own right. In uncovering a sub-national developmental state, this thesis has shown that there is room for agency at the local level, given certain conditions. Despite an unsupportive national context for its ambitions, the Penang State Government acted as a catalyst for an entirely new industry and revitalized its ailing economy. Conversely, in spite of a unique competitive advantage and a burgeoning software sector, the Government of Karnataka was manifestly slow in implementing supportive measures.

Furthermore, the Penang case study shows that in addition to possessing a certain amount of agency, contrary to received wisdom, influence does not only flow from national to sub-national states. Rather, it is bi-directional as sub-national states can also influence their national counterparts. In addition to its early support for the electronics sector, through its privileged access to industry-relevant information, the state government was able to influence the federal government. However, this may be an
exception rather than the rule as, in spite of Karnataka’s particularly dynamic software cluster, the state government’s ability to influence national policies was limited.

Summing Up

In applying the DS framework to two national and two sub-national states, the framework correctly pinpoints the relevant institutional characteristics necessary for fostering economic transformation at both levels of governance. However, an analysis of the two national and two sub-national states, shows that several aspects of the DS framework are under-developed. In particular, greater attention needs to be paid to the nature and composition of the private sector, relationships between state agencies, the wider political and economic context, the autonomy of sub-national states to pursue their own policy goals, and the fact that institutions evolve over time. This thesis has carried out such an extension of the DS framework through its examination of the cases of Penang and Karnataka. This yielded productive results, showing that while local-level state institutions were only peripheral in shaping Karnataka’s economic trajectory, they were pivotal in enabling Penang to emerge as Malaysia’s most dynamic electronics centre. Thus, attempts to understand sub-nation economic dynamics cannot stop at the national-level institutional context, but must factor in an analysis of local-level institutions.

Policy Implications

The two national states and two sub-national states implemented a variety of market-complementing and developmental policies in order to foster the growth and upgrading of their respective sectors. A brief comparison enables various conclusions regarding the effectiveness of particular policy approaches to be made.

Market-Complementing Measures

*Overall Policy Approaches*
Due to their greater access to resources and wider range of responsibilities, Malaysia and India had a broader range of policy options open to them than their sub-national counterparts. In their quest to create or foster new industries, Malaysia and India used a variety of wide-ranging and often expensive measures, including: exchange rate devaluation, subsidies, preferential purchasing, tariff and non-tariff barriers, as well as creating a legion of state-owned enterprises.

In Malaysia's case, these measures were used in domestic-oriented sectors of the economy, where the state sought to develop strategic sectors and allow a Bumiputera commercial and industrial class to develop. For a brief period, they were also used to create a range of publicly-owned heavy industries. Due to their economic unsustainability, these measures were cut back, and only persist in specific export-oriented sectors such as the auto industry.

Similar measures were used even more extensively in India, where the state was to take a leading role in most technologically-intensive sectors, leaving the less vital consumer goods sectors to local entrepreneurs.

Furthermore, in both cases, the state sought to impose heavy regulation on the private sector. In Malaysia's case, this took the form of Bumiputera equity and employment requirements, as part of the drive to re-distribute wealth and economic opportunity between ethnic groups. In India's case, this entailed a raft of restrictive regulations on firm activity on location, production levels, inputs, and purchasing practices which were passed as a part of populist campaigns to garner political support.

Given the pursuit of multiple and often-conflicting goals at the national level, these measures were ultimately unproductive. In the long run, due to the absence of performance standards to accompany protective measures, as well as the prevalence of rent-seeking, these policies did not create or foster viable industries. In both cases, the possibility of economic, and thus political, ruin prompted these measures to be rolled back.

In contrast, Penang and Karnataka's provincial status precluded many of these rather 'heavy-handed' measures. Imposing tariff measures or engaging in expensive subsidies was not economically or politically feasible. As a result, with the exception of a few
pilot ventures (in the case of Penang) or a small state-owned enterprise (in the case of Karnataka), neither government was able to channel resources to firms or create a local ‘champion’. This pushed the sub-national states towards more indirect but nonetheless ‘facilitating’ interventions, seeking to enhance firm performance rather than financing or undertaking production directly. In addition, the Penang State Government’s high levels of institutional capacity and drive enabled it to circumvent resource constraints through undertaking a variety of revenue-raising measures.

However, it is also important to note that, at the national level, the electronics and software sectors were spared large-scale direct intervention. In Malaysia’s case, the state divided the economy into separate segments, with a protected, domestically-oriented sector, and a largely foreign-owned export oriented sector. The state was active in the domestic sector, largely leaving export-oriented sectors to international investors and small, local supplier firms. The electronics sector was thus largely foreign and Chinese-owned, and not overly affected by federal government policies. In India’s case, the software sector was entirely new and unaffiliated with traditional industries. Furthermore, the pivotal role of the Department of Electronics moved the sector away from the traditional state-led model towards a more business-friendly approach. More direct involvement from either national government would have made it difficult for the sub-national governments to chart different policy directions.

The Standard Policy Package

Aside from trade-related protective measures and subsidies, both national and sub-national states implemented a standard policy package to attract investment and bolster their competitive advantage vis-à-vis other countries or provinces. This consisted of investment incentives, investor liaison services, targeted infrastructure facilities, and the provision of trained or skilled workers.

While the two national states passed incentive measures and created investment facilitation agencies, these played a greater role in Penang and Karnataka’s industrial policies. Both state governments sought to capitalize on their greater proximity to local market actors and leverage their control over a range of local taxes and permits. In addition, the Penang State Government was able to capitalize on its personalized
attention to international investors and effective lobbying powers with the federal government.

Both national and both sub-national states sought to offer targeted infrastructure. In addition to providing superior infrastructure for specific industry needs, the provision of technology parks also enabled national and sub-national governments to circumvent particularly mediocre infrastructural conditions. While used in Malaysia and India, technology parks played more of a role in India and Karnataka for two reasons. First, the STPI initiative, through providing access to advanced telecommunications equipment, enabled the software sector to target overseas markets. In contrast, electronics firms catered to local MNC affiliates and did not require such high-end infrastructure. Second, given the parlous state of infrastructure in India in general and Karnataka in particular, providing specialized facilities in a circumscribed area provided a means of compensating for this.

All states moved to increase their human resource base to attract and retain investment. That said, Malaysia was manifestly unsuccessful at generating the quantity and quality of skilled workers needed to help the electronics sector upgrade. However, Penang was particularly proactive at fostering joint ventures between the state government and leading firms for industry-relevant training. In addition, the state government was very entrepreneurial at soliciting private sector investment in further education to bolster the state’s resource base. However, it was constrained by its limited resources and inability to influence national-level education policy.

In contrast, India’s, and particularly Karnataka’s, human resource base was developed serendipitously. The sheer size of the country and state’s education system entailed a sufficiently large talent pool. Furthermore, the struggle for public sector jobs in Karnataka engendered a race for educational qualifications that dramatically bolstered the province’s skill base. While general quality is still an issue, both central and state governments are moving to ensure minimum standards.

*Changing Policy Needs*

However, in all cases, after the initial phase of growth, policy needs changed away from simply providing inputs and targeted infrastructure towards more selective
interventions. Diseconomies of scale began to demand attention, as did the need for more specific inputs and an environment conducive to the emergence of new firms and greater innovation.

Due to their greater resources, the governments of Malaysia and Penang were able to implement a variety of market-complementing measures. The Malaysian state moved to provide access to finance, R&D funding, as well as a variety of measures to reduce information and coordination externalities. However, the effectiveness of these policies was limited by a legacy of mistrust between the state and the Chinese-owned manufacturing sector. The Penang State Government also implemented a variety of measures to foster the growth of the electronics sector, including reducing risk for new activities, marketing local firm capabilities, and matchmaking between MNCs and local supplier firms. These policies proved successful whilst the state government enjoyed legitimacy amongst the local manufacturing sector, but lost effectiveness when the province’s political context changed.

In contrast, the governments of India and Karnataka were less able to implement such measures. In addition to resource constraints, this was due, in part, to the software sector’s high level of organization and self-sufficiency. However, at the national level, firms were given marketing and technical advice through the STPI initiative and export advice through the ESC. In Karnataka, the state government undertook promotional activities and sought to increase access to finance for the local software industry. In most cases, these measures were implemented after the software sector was consolidated and did not contribute to its emergence.

‘Developmental’ Interventions

Beyond market-complementing measures, both national and sub-national states implemented a variety of ‘developmental’ policies that had implications for their respective sectors.

The Malaysian state was successful at articulating a vision for development and resolving conflict among different interest groups. However, the vision was only tangentially related to economic growth and transformation. While the pursuit of the inter-ethnic redistribution of wealth helped defuse racial tension, it often detracted from
the drive to create competitive industries. Similarly, India articulated a secular, democratic, and state-led model of development. While greater political participation and delicate inter-communal negotiations largely precluded civil strife, the resulting range of mobilized interest groups made the single-minded pursuit of economic transformation difficult.

In contrast, Penang's sub-national state moved clearly and decisively to articulate a vision of development and effectively marshalled efforts towards that end. It also defused potential conflict by moving to include the Chinese business community, but also ensure that all ethnic groups benefited. Karnataka, for its part, was less able to generate a vision for development, and while its inclusive political process lessened conflict it also made forging and maintaining links with the private sector difficult.

Regarding institutional arrangements for innovation, both national and sub-national cases demonstrate the importance of supportive institutions for reducing information asymmetries and collective action failures as well as mentoring firms. At different times, institutions like the PDC or Bangalore's Software Technology Park provided firms with marketing advice, mentoring services, or access to needed infrastructure. These services, when provided, proved immensely valuable at helping small firms emerge and grow. However, national and sub-national states in both countries struggled to provide these services continuously, due their intermediate institutional capacities and/or the low importance attached to SMEs.

Private sector institutions can and do play a productive role in feeding information into policy-making and providing an array of services for local firms. However, in both sectors and countries, the business associations that emerged tended to favour large firms and address articulated needs. Smaller firms were not as well represented, and few 'self-discovery' initiatives or innovative business practices were attempted. Similarly, academic and research institutions tended to create links with larger, more established firms. Thus, left to their devices, private sector and research organizations may not provide a comprehensive answer to firm needs.

It is difficult to establish whether national or sub-national policies helped foster regionally-specific cultures or institutional environments. In Penang and Karnataka specifically, and Malaysia and India more widely, inter-firm relationships were
relatively undeveloped, with firms reluctant to collaborate or form networks. Neither region’s spatially-located competitive advantage offered firms anything more than standard agglomeration economies. This may partly be due to the fact that firms in both sectors service overseas markets, thus reducing the formation of linkages between firms in each cluster. However, it is also due to the fact that institutional arrangements can be more directly affected by policy choices, but institutional environments characterized by networks of trust and collaboration take longer to cultivate.

Following on from this, the more subtle policies needed to create an innovative environment seemed manifestly beyond the capacity of either the national or sub-national states, who were able to alter each region’s institutional arrangements but unable to help build up the social fabric around them. This may indicate that this type of flexible and responsive policy-making is beyond the capacity of ‘intermediate’ states such as Malaysia and India. Similarly, despite their greater local knowledge and closer links to firms, this may also be beyond the capacity of many sub-national states.

Successful Policy-making

What can be learned from instances of effective policy-making? The Penang Development Corporation, the Department of Electronics, and the Karnataka State Department of IT were effective precisely because of their communication with entrepreneurs. None of these institutions had particularly wide-ranging responsibilities or large budgets, thus the effectiveness of the policies that followed were a fruit of this dialogue.

However, national-level state institutions were also present in Penang and Karnataka – with different results. While Malaysia’s omni-present federal government institutions did little to develop Penang’s industries, India’s Department of Electronics, through crucial negotiations with MNCs, contributed to Bangalore’s growth. In addition, the Software Technology Park of Bangalore, despite being a federal government institution, actively contributed to Bangalore’s developing institutional environment. Thus, counter-intuitively, national-level institutions can sometimes take on more local-level roles in nurturing firms or fostering collective efficiency. Conversely, lower levels of government are not always able to establish more effective lines of communication with local actors.
At the end of the day, institutional capacity is key, supporting the relevance of the ‘pocket of efficiency’ concept. Whether at the federal level, in India’s Department of Electronics, or at the sub-national level, in the Penang Development Corporation, a cohesive, professional state institution that establishes communication with the private sector to foster economic growth can have an enormous effect. Thus, more than resources or, indeed, standard policy responses, the institutional characteristics of a given state institution are key in enabling it to have a positive impact.

Conclusion

This thesis has sought to explore whether, and in what circumstances, sub-national state institutions can, like their national counterparts, play an influential role in fostering economic transformation.

Abstracting away from initial physical and political conditions, the answer is a qualified ‘yes’, as the case studies show a region’s institutional and policy context can positively influence its economic trajectory.

While the generalisable conclusions made on the basis of two countries and two regions are limited, insights can be drawn from their analysis and comparison that may have relevance elsewhere. Thus, by carrying out this research, this thesis has shed light on phenomena of interest, such as state structures, public-private sector relations, different types of state policies, and how these affect the potential for industrial transformation. In doing so, this thesis has contributed to furthering knowledge in four principal areas.

First, this thesis demonstrates that extending the national-level developmental state framework downwards to the sub-national level is possible and fruitful. The results of in-depth fieldwork in Penang and Karnataka allowed the Developmental State framework to be applied at the provincial level, showing that sub-national states can and do act as agents in fostering the development of their economies. Applying the framework at this level, rather than treating sub-national states as mere extensions of their national counterparts, helps us understand why some sub-national units are more
dynamic than others. As with their federal counterparts, their actions are shaped by their institutional capacity, policy priorities, and relationship with the private sector.

Second, this thesis contributes to our understanding of how and under what conditions sub-national states can foster economic development. In addition to institutional capacity, a commitment to pursuing economic growth, and communication with the private sector, sub-national states also need sufficient autonomy from — more than harmonious relationships with — their national-level counterparts. Furthermore, their ability to establish communication with different sections of the private sector as well as the wider political and economic context within which they make strategic choices are key. Last, ‘developmental combinations’ change over time as the institutions underpinning them evolve.

Third, this thesis examines how ‘new economy’ clusters are emerging in developing countries and how different policies can shape their evolution. The case studies demonstrate that clusters can be created or initially fostered by providing an enabling environment and necessary factor endowments. However, as a firm cluster matures, policy needs change away from the traditional input-driven approach to industrial policy, and require more tailored policies and institutions to address specific market failures. The national and sub-national states were sometimes able to alter their institutional arrangements to reduce barriers for firms, which was well-received. However, the more subtle and gradual measures needed to create an institutional environment conducive to greater inter-firm collaboration surpassed their capabilities. The respective states concentrated on creating new institutions rather than working on the social fabric connecting state institutions to firms on one hand and between firms on the other.

Finally, this thesis demonstrates that there is a spatial dimension to economic activity. By analysing how two national and two sub-national states interacted with their respective economies, this thesis shows how sub-national as well as national institutional contexts can have determining effects on how a specific industry develops. In a world full of ‘intermediate’ national-level states, this new application of the Developmental State framework opens the door to exploring a variety of dynamic sub-national economies.
APPENDICES
Appendix 1

Research Methodology

Regarding data gathering, the interviews and most primary and secondary data were collected during seven months of fieldwork. Four months were spent in Malaysia and Singapore, and three in India.

In Penang, I was affiliated with the Socio-economic and Environmental Research Institute (SERI) which functions as the Penang State Government’s policy research unit. In Bangalore, I was affiliated with the Indian Institute of Information Technology – Bangalore (IIIT-B) which specializes in research and training for the local software industry, and is jointly funded by the Karnataka State Government and the private sector. Both institutes provided crucial logistical and institutional support.

Information and data for this thesis came from three sources. The first was available secondary material on: the electronics and software industries; national-level institutions and policy frameworks; as well as scattered material on state-level institutions and policies. This included academic work, policy-related material, and more industry-related publications. The second was available primary material such as official statistics, government reports, and publications. In order to gather this information, ten libraries and four newspaper archives were consulted in Australia, India, Malaysia, and Singapore, as well as numerous government and private sector organizations. The Internet proved a particularly valuable additional resource.

The third and most fruitful source of information was a series of semi-structured key informant interviews. Interviewing was chosen as the prime data-gathering method because it offers ‘access to people’s ideas, thoughts, and memories in their own words rather than in the words of the researcher’ (Reinharz 1992:18). Semi-structured interviews allow questions to be tailored to tap each informant’s expertise, and similarly permit flexibility to explore specific topics in greater depth. In addition, personally conducting the interviews
allows dialogue to be supplemented with non-verbal communication. The majority of interviews were held in interviewees’ workplaces, which also provided valuable additional information. In the case of companies, I was often able to see the factory floor, or in the case of government offices, I was able to glean an idea of how businesspeople could be received.

A total of one hundred key informant interviews were carried out, with 60 conducted in Malaysia and 40 in India. The interviewees fell into five broad groups.

The first group was comprised of current and former state government officials from Penang and Karnataka. Relevant departments related to economic development, industry, infrastructure, and education were targeted. Interviews with these officials sought to establish the bureaucratic capacity of their departments, their relationship with other state and federal government agencies, and their interaction with the local business community.

The second group was composed of current and former federal government officials working in the states I was studying. As with the first group, I targeted ministries or departments tasked with economic, industry, or education issues. I similarly sought to explore how federal government agencies related with their state government counterparts, and how sensitive these officials were to the state’s regional specificities.

The third group was comprised of private sector organizations. This included national and local business associations of the different ethnic and industry groups in each state. It also included a selection of enterprises across the spectrum of firms, such as small local companies, large domestic firms, and multinational corporations. The interviews sought to understand why these firms chose to locate in the state in question, their perceived needs, and their opinions of state and federal government policies and institutions.

The fourth group encompassed recruitment agencies and education providers. Given the skill-intensive nature of the industries, I sought to establish each state’s success at providing ‘soft’ infrastructure to attract and retain investment, and whether this was a result of conscious policy-making on the part of state or federal authorities.
The fifth group was composed of 'industry observers', which included academics, journalists, and market analysts, who provided expertise in specific areas and served to 'triangulate' information from the other sources.

Where possible, the informants' names, positions, and dates of the interviews are provided. In the cases of some firms, government officials, or industry observers, their names are withheld but dates and places of the interviews are provided. In cases where an interviewee cited elsewhere in the thesis requested anonymity for a specific statement or I judged it prudent to withhold their names, a generic identifier (i.e. industry observer) and the month and place of the interview are given.
Appendix Two

Alternative Approaches

It is worth asking whether there are other approaches that would be more suited to exploring the role of sub-national institutions in fostering economic transformation. There are two other 'institutional' approaches that could, in principle, be utilized.

The first approach is the National Innovation Systems (NIS) school. Developed by Freeman (1988), Lundvall (1988, 1992), and Nelson (1988, 1993), this approach conceives of innovation as a gradual process based on organizational learning, where firms gradually learn how to 'master and put into practice product designs and manufacturing processes that are new to them' (Nelson and Rosenberg 1993:4).

The firm is conceptualized as a learning organization that forms part of a broader institutional setting. Thus, the NIS approach 'lays emphasis on the interactive process in which enterprises in interaction with each other and supported by institutions and organizations...play a key role in bringing new products, new processes, and new forms of organization into economic use' (Mytelka and Farinelli 2000:7).

In its 'narrow' application, the NIS approach restricts itself to those institutions that are directly concerned with scientific and technical activities. The 'broader' approach looks at the wider institutional framework within which political and cultural institutions as well as economic policies affect innovation (Lundvall et al. 2002:226). Originally applied to the national level, more recent studies have attempted to apply this framework to the sub-national level (Cooke et al. 1997, Freeman 2002).

While this approach is sensitive to the effect of institutions on economic performance – for the purposes of this thesis, it suffers from two shortcomings. First, the NIS approach has been predominantly applied to industrialised countries with established innovation systems. Thus, while it provides useful tools for understanding how a particular institutional
configuration can boost firm performance, the NIS approach largely takes these institutional contexts as given and does not analyse how such institutions must be ‘installed’ or developed. Therefore, this is less useful for understanding how developing countries can boost their innovative capabilities. In many cases, this must be through more low-cost measures rather than the more scientific and technical measures envisaged by the NIS school (Storper and Scott 1995:519).

Second, this approach focuses on the firm, rather than the state. Therefore it is less suited for understanding the political dimensions of how and why institutions change over time and why a particular sector or set of policies is chosen over another. In particular, the NIS approach assumes that innovation-enhancing policies are welfare-enhancing *per se* and thus will receive broad public support (Lundvall et al. 2002:226). However, economic growth and transformation generates winners and losers, and the state must mediate, negotiate, and allocate resources according to political, as well as economic, criteria.

The second approach is the Business Associations school, which explores how the private sector can organize and contribute to economic governance through addressing collective action problems and other market failures. Doner (1992), Schneider and Maxfield (1997), and Doner and Schneider (2000) argue that the private sector, as with the state, can be similarly developmental or predatory. Given the correct conditions, such as encompassing industrial associations, competitive clientelism, and a capable state bureaucracy, business associations can be enlisted by the state in long-term productive efforts to foster economic transformation.

The business association approach is helpful as it provides tools for identifying how the private sector can foster economic growth, particularly in contexts with under-performing states. In addition, while it has not yet been done, it could, arguably, be applied to the sub-national level, through exploring how local-level or sub-national branches of business associations contribute to economic governance.

However, following Evans’ logic, this approach is only one component in understanding economic transformation at the sub-national level. The relationship between the state and the private sector only assumes relevance for economic transformation once the state’s
priorities and capabilities have been established. Furthermore, state policy can, and does, fundamentally affect the nature and structure of the private sector and its constituent associations.

According to this line of reasoning, primacy must first be given to the state in order to understand the effects of its internal structure and capabilities on the context within which private sector actors operate, before seeking to understand how organizations such as business associations and firms can contribute to economic transformation.

Therefore, the priority given to state institutions, its relevance for developing country contexts, and its applicability to both the national and sub-national levels, make the Developmental State framework the most suitable approach for exploring this thesis' central question.
BIBLIOGRAPHY
Bibliography

Primary Material

Karnataka

Interviews - Bangalore

Jawaid Akhtar IAS, Director, Department of IT and Biotechnology, Government of Karnataka, Bangalore, 30/06/2004
Vivek Anjana, Visiting Faculty, Finance and Control Area, IIM-B, Bangalore, 21/05/2004
Rajendra Bandi, Associate Professor, Chairperson, Centre for Software and IT Management, IIM-B, Bangalore, 13/07/2004
Rupa Chanda, Professor, IIM-B, Bangalore, 04/08/2004
R.V. Deshpande, Minister (1994-2004), Ministry for Medium and Large Industry, GoK, Bangalore, 04/08/2004
N. Dayasindhu, Research Officer, Infosys, Bangalore, 21/06/2004
H. Gowda, CEO, Karnataka Industrial Areas Development Board (KIADB), GoK, Bangalore, 04/08/2004
Roland Haas, Managing Director, DaimlerChrysler, Bangalore, 03/08/2004
D.B. Inamdar, Minister (2001-2004), Ministry for IT and Biotechnology, GoK, Bangalore, 27/07/2004
Mohamed Iqbal, Executive Officer, Karnataka Udyog Mitra, Bangalore, 22/06/2004
Vignesh Ilavarasan, Post-doctoral Fellow, IIT-B, Bangalore, 08/06/2004
Gurunath Kulkarni, Managing Director, Karnataka Udyog Mitra, Bangalore, 22/06/2004
Vivek Kulkarni, Secretary to Government (1999-2003), Department of IT and Technology, GoK, Bangalore, 01/07/2004
Deepak Kumar, Deputy Editor, ‘Software Dioxide’ magazine, Bangalore (22/06/04).
Manish Kumar, Technical Officer, KITVEN Fund Manager, Karnataka Asset Management Co., Bangalore, 26/05/2004
Mathew Manimala, Professor of Organizational Behaviour and Entrepreneurship, NSRCEL, IIM-B, Bangalore, 13/07/2004
Mary Mathew, Associate Professor, School of Management, IISc, Bangalore, 19/07/2004
S. Mohan, Senior Officer - Marketing, International Technology Park Bangalore, Bangalore, 14/07/2004
N. Muralidharan, Managing Director and Vice President, Jobstreet.Com, Bangalore 07/06/2004
K.S. Nandakumar, Regional Director, Manufacturers’ Association for Information Technology (MAIT), Bangalore, 30/06/2004
M.R. Narayana, Professor and Head, Economics Unit, Institute for Social and Economic Change, Bangalore, 08/07/2004
V.D. Nishchith, Executive Officer (Bio-tech), Karnataka Biotechnology and Information Technology Services (K-BITS), Bangalore, 18/06/2004
R. Panchaksharaiah, Administrative Officer, Board for IT Educational Standards (BITES), Bangalore, 18/06/2004
Anand Parthasarathy, Journalist, The Hindu, Bangalore, 05/08/2004

373
Balaji Parthasarathy, Associate Professor, IIIT-B, Bangalore, 08/06/2004
Murali Patibandla, Professor, Corporate Strategy and Policy, IIM-B, Bangalore, 09/07/2004
Roona Pradeepkumar, Administration Executive, Indo-American Chamber of Commerce, Bangalore, 28/05/2004
Krishnan Puthucode, CEO, Software Quality Center, Bangalore, 18/07/2004
T. Ramappa, Secretary, Federation of Karnataka Chambers of Commerce and Industry, Bangalore, 13/07/2004
Reena Rao, Centre Head, NIIT – Richmond Road Branch, Bangalore, 16/07/2004
Kavitha Reddy, Assistant Vice President, TeamLease, Bangalore, 07/07/2004
R. Remali, Executive Officer, Software Technology Parks of India – Bangalore, Bangalore, 23/06/2004
A.S. Seetharamu, Professor, Education Unit, Institute for Social and Economic Change, Bangalore, 08/07/2004
S.P. Singh, Deputy Regional Director, All India Council on Technical Education (AICTE), Bangalore, 13/07/2004
Surjith Singh, Senior Executive, Electronics and Computer Software Export Promotion Council (ESC), Bangalore, 18/06/2004
S. Sivaguru, SME Special Interest Group, Software Process Improvement Network (SPIN), Bangalore, 06/07/2004
S. Sunath, Sales Consultant, International Technology Park Limited, Bangalore, 14/07/2004
Preethi Thomas, Consultant, Client Relations and Delivery, Staffing Solutions, Ma Foi Management Consultants Ltd., Bangalore, 17/07/2004

Firms
Senior Executive – Techno-Commercial, Statistical software product firm (Firm A)
Bangalore, 07/06/2004
Vice-President, Sales and Marketing, Engineering software services firm (Firm B)
Bangalore, 11/06/2004
Chief Operating Officer, Telecom software product firm (Firm C), Bangalore, 11/06/2004
General Manager – Marketing, Software quality assurance firm (Firm D), Bangalore, 14/06/2004

Policy Documents
Websites
Bangalore IT.in
www.bangaloreit.in
Centre for Scientific and Industrial Consultancy, IISc
http://www.csic.iisc.ernet.in/
Confederation of Indian Industry
http://www.ciionline.org/
Indian Institute of Information Technology – Bangalore
http://www.iiit.ac.in/
Indian Institute of Management – Bangalore
http://www.iimb.ernet.in/
Indian Institute of Science
http://www.iisc.ernet.in/
International Technology Park Limited
http://www.intltechpark.com/
National Association of Software Services
www.nasscom.org/
N.S. Raghavan Centre for Entrepreneurial Learning (IIM-B)
http://www.nsrcel.org/
Society for Innovation and Development, IISc
http://www.sid.iisc.ernet.in/
Software Technology Parks of India – Bangalore
http://www.blr.stpi.in/index.htm
Twelfth Finance Commission
http://fincomindia.nic.in/

Penang

Interviews – Penang and Kuala Lumpur
Moha Asri Abdullah, Associate Professor, Division of Geography, USM, Penang, 20/02/2004
Jason Ban, Branch Manager, Adecco-Malaysia, Bayan Lepas, Penang, 30/03/2004
Tajuddin Carrim, former Human Resources Manager, Motorola, Kuala Lumpur, 04/05/2004
Mark Chang, CEO, Jobstreet, Bayan Lepas, Penang, 04/02/2004
Cheah Mei Lin, Executive Secretary, Penang Chinese Chamber of Commerce, Penang, 24/02/2004
Chong, E.K., former Manager, Intel, and Director, Disted-Stamford College, Penang, 09/04/2004
Hean-Teik Chuah, Dean, Faculty of Engineering, Multimedia University, Cyberjaya, 28/04/2004
Dato’ Anwar Fazal, former PDC official, Founder, Consumers’ Alliance of Penang, Penang, 05/04/2004
Gan Ee Kiang, former Dean of Pharmacy, and Director, Unisains Holding, USM, Penang, 08/03/2004
Goh Ban Lee, Associate Professor, School of Social Sciences, USM, Penang, 25/02/2004

375
Michelle Goh, Branch Executive, Malaysian International Chamber of Commerce and Industry, Penang, 26/03/2004
Edmund Terence Gomez, Professor, Faculty of Economics and Business Administration, University of Malaya, Kuala Lumpur, 06/05/2004
Danny Goon, Honorary Treasurer, FREPENCA, Penang, 05/02/2004
Zulkifli bin Harun, Human Resource Manager, Sanmina-SCI, Perai, Penang, 18/03/2004
Albert Kam, Senior Finance Manager, Sanmina-SCI, Perai, Penang, 18/03/2004
Khoo Boo Teik, Associate Professor, School of Social Sciences, USM, Penang, 08/04/2004
Lee Kam Hing, Research Director, The Star, Kuala Lumpur, 30/04/2004
Molly Lee, Associate Professor, School of Educational Studies, USM, Penang, 17/02/2004
Dato’ O.K. Lee, Representative, Federation of Malaysian Manufacturers, Northern Region, Penang, 06/02/2004
Lee Shok Mee, Head, Penang Educational Consultative Council, Penang, 10/03/2004
Lim Pao Li, former senior manager, PDC (1972-1999), Kuala Lumpur, 10/05/2004
Francis Loh, Professor, School of Social Sciences, USM, Penang, 20/02/2004
Low Swee Heong, Chief Operating Officer, Collaborative Research and Resource Centre, Penang, 25/02/2004
Raffic Haji Mohammad, Executive Secretary, Penang Malay Chamber of Commerce, Penang, 25/03/2004
Mukenden Menon, former senior manager, PDC, and Deputy CEO, Penang Medical College, Penang, 03/03/2004
Hari Das Nair, Vice-Chairman, Malaysian International Chamber of Commerce and Industry, Penang, 26/03/2004
Suresh Narayanan, Associate Professor, School of Social Sciences, USM, Penang, 26/01/2004
B.L. Ooi, Group CEO, AKN Technology, Bayan Lepas, Penang, 17/03/2004
Subramaniam Pillay, Associate Professor, School of Management, USM, Penang, 16/02/2004
N. Ramanathan, President, Malaysian-Indian Chamber of Commerce, Penang, 10/03/2004
Dato’ R. Ratnalingam, former Director, Innovation and Consultancy Centre, USM, and President, Penang Medical College, Penang, 19/02/2004
Anthony Santrom, Branch Manager, Manpower, Bayan Lepas, Penang, 17/03/2004
Dato’ Robin Seo, Country Manager, Motorola Technology, Bayan Lepas, Penang, 04/03/2004
Zaihan bin Shukri, PKT, Director, Japan-Malaysia Technical Institute, Seberang Perai, Penang, 08/04/2004
Othman bin Sidek, Associate Professor and Dean, School of Electrical and Electronic Engineering, USM, Seberang Perai, Penang, 30/03/2004
Moorshidi Sirat, Professor, Department of Geography, USM, Penang, 04/02/2004
Dato’ Boonler Somchit, Executive Director, Penang Skills Development Centre, Bayan Lepas, Penang, 24/02/2004
Tan Seang Aun, Branch Manager, Federation of Malaysian Manufacturers, Northern Region, Seberang Perai, Penang, 05/03/2004
Michael Yap, Principal, INTI College, Penang, 11/03/2004
Dato’ B.J. Yeang, former Deputy General Manager, PDC, General Manager, InvestPenang, Bayan Lepas, Penang, 31/03/2004
Yeoh Keat Seng, Chief Executive Officer, Chief Investment Officer, Commerce Asset Fund Managers, Sdn. Bhd., Kuala Lumpur, 11/05/2004
Yoon Chon Leong, Director, Corporate Relations and Technology, Agilent Technologies, Bayan Lepas, Penang, 31/03/2004

*State and Federal Government Agencies*

Officials, Penang Development Corporation, Bayan Lepas, Penang, 13/02/2004 and 20/02/2004
Official, Human Resources Development Corporation (HRDC), Northern Region, Bandar Seberang Jaya, Penang, 24/03/2004
Official, Malaysian Industrial Development Authority (MIDA), Penang, 06/04/2004
Official, Malaysian Industrial Development Finance Bhd. (MIDF), Penang, 19/03/2004
Official, Malaysian Institute of Microelectronic Systems (MIMOS), Technology Park Malaysia, Kuala Lumpur, 12/05/2004
Official, Standards and Industrial Research Institute of Malaysia (SIRIM), Northern Region Office, Permatang Pauh, Penang, 05/04/2004
Official, Small and Medium Industry Development Corporation (SMIDEC), Bukit Minyak, Penang, 05/03/2004

*Firms*

Engineering Director, Precision engineering firm (Firm A), Penang, 02/03/2004
Director, Engineering firm (Firm B), Bayan Lepas, Penang 04/03/2004
Managing Director, Precision engineering firm (Firm C), Bukit Minyak, Penang, 12/03/2004
CEO, Precision engineering firm (Firm D), Bayan Lepas, Penang 17/03/2004
Manager, Precision engineering firm (Firm E), Seberang Perai, Penang 03/18/2004
Managing Director, Integrated circuit manufacturer (Firm F), Bayan Lepas, Penang 02/04/2004
Managers, Machine tool firm (Firm G), Seberang Perai, Penang, 04/04/2004

*Individuals*

Journalist, Kuala Lumpur, 07/05/2004
Principal, Tertiary Education College, Penang, 23/03/2004
Researcher, Kuala Lumpur, 07/05/2004
Venture Capitalist A, Penang, 19/03/2004
Venture Capitalist B, Kuala Lumpur, 10/05/2004

*Annual Reports and Surveys*

DCT, Annual Survey of the Manufacturing Industries in PDC Industrial Areas, DCT Consultancy Series, 2000-02.
Policy Documents


The Constitution of Malaysia, available at

http://www.helplinelaw.com/law/constitution/malaysia/malaysia01.php

Speeches & Party Documents


Websites

Centre for Policy Research
http://www.usm.my/cpr/index.html

Gerakan Party
http://www.gerakan.org.my/

InvestPenang
http://www.investpenang.gov.my/

Penang Development Corporation
http://www.pdc.com.my/

PenangNET
http://www.penang.net.my/index.cfm

Penang Photonics Consortium

Penang Skills Development Centre
http://www.psd.com.my/
Secondary Material


Loh, F., 2004a. 'Looking Beyond Developmentalism: the MCA must return to the struggle for democracy', Aliran Monthly, 24(10).

Loh, F., 2004b. 'Understanding the 2004 Election Results: Looking Beyond the Pak Lah Factor', Aliran Monthly, 24(3).


Manor, J., 1984. 'Blurring the Lines between Parties and Social Bases: Gundu Rao and the 
Emergence of a Janata Government in Karnataka', in J.R. Wood (ed.), State Politics 
in Contemporary India: Crisis or Continuity, Westview Press, Boulder:139-68.
Manor, J., 1988. 'Parties and the Party System', in A. Kohli (ed.), India's Democracy, 
in F. Frankel (ed.), Dominance and State Power in Modern India, Oxford 
University Press, Delhi:322-61.
Manor, J., 2004. 'Explaining Political Trajectories in Andhra Pradesh and Karnataka', in R. 
Manor, J., 2005. 'Changes in Karnataka over the Last Generation: Villages and the Wider 
Context', paper delivered at the conference on Development in Karnataka: A Multi-
Disciplinary Perspective, Institute for Social and Economic Change, Bangalore, 
June 10-12.
Martin, R., 1999. 'The new 'geographical turn' in economics: some critical reflections', 
Martin, R., 2000. 'Institutional Approaches to Economic Geography', in E. Sheppard and 
T.J. Barnes (eds), A Companion to Economic Geography, Blackwell Publishers, 
Mauzy, D.K., 1993. 'Malaysia: Malay Political Hegemony and "Coercive 
Consociationalism"', in J. McGarry and B. O'Leary (eds), The Politics of Ethnic 
Mawdsley, E., 2002. 'Redrawing the Body Politic: Federalism, Regionalism, and the 
Creation of New States in India', Journal of Commonwealth and Comparative 
Politics, 40(3):34-54.
McKendrick, D.G., Doner, R.F. and Haggard, S., 2000. From Silicon Valley to Singapore: 
Location and Competitive Advantage in the Hard Disk Drive Industry, Stanford 
University Press, Stanford.
Singapore.
Menocal, A.R., 2004. 'And if there was no state?: critical reflections on Bates, Polanyi, and 
Evans on the role of the state in promoting development', Third World Quarterly, 
Industrial Development Authority, Kuala Lumpur.
Bangalore's Success Story and its Replicability in Kolkata, Institute for New 
Technologies, United Nations University, Maastricht.
Montero, A.P., 1997. 'Shifting States in Uneven Markets: Political Decentralization and 
Subnational Industrial Policy in Contemporary Brazil and Spain', International 
Working Group on Subnational Economic Governance in Latin America and 
Southern Europe, Columbia University, New York, September 10-12.


393


Reed Electronics Research, 2004. Yearbook of World Electronics Data, BEP Data Services, Luton.


Searle, P., 1999. The Riddle of Malaysian Capitalism: Rent-seekers or Real Capitalists?, Allen and Unwin, NSW.


Newspapers and Magazines

Asiaweek
Boston Globe
Business India
Business Line
Businessworld
Cyber India Online, http://www.ciol.com/
Dataquest
Economic and Political Weekly
Economic Times
Electronic Business
Far Eastern Economic Review
Frontline
Indian Express
Malaysian Business
Outlook
Rediff Online, http://www.rediff.com/
Times of India
The Deccan Herald
The Edge
The Economist
The Financial Express
The Hindu
New Straits Times
The Star
The Sun

Websites