

# Johor and its Electronics Sector: One Priority among Many?

**ISEAS Working Paper #1** 

By: Francis E. Hutchinson Visiting Research Fellow Regional Economic Studies Programme Institute of Southeast Asian Studies Email: fhutchinson@iseas.edu.sg

2012

The ISEAS Working Paper Series is published electronically by the Institute of Southeast Asian Studies.

© Copyright is held by the author or authors of each Working Paper.

Papers in this series are preliminary in nature and are intended to stimulate discussion and critical comment. The Editorial Committee accepts no responsibility for facts presented and views expressed, which rests exclusively with the individual author or authors. No part of this publication may be produced in any form without permission. Comments are welcomed and may be sent to the author(s)

Citations of this electronic publication should be made in the following manner: Author(s), "Title," ISEAS Working Paper on "...", No. #, Date, www.iseas.edu.sg

#### **Working Paper Editorial Committee**

Lee Hock Guan (editor) Terence Chong Lee Poh Onn Tin Maung Maung Than

#### **Institute of Southeast Asian Studies**

30, Heng Mui Keng Terrace Pasir Panjang Singapore 119614

Main Tel: (65) 6778 0955 Main Fax: (65) 6778 1735

Homepage: www.iseas.edu.sg



# Introduction

Malaysia is a quintessential Little Tiger, one of a group of Southeast Asian countries that managed a transition from a predominantly agriculture-based economy to one with a vibrant manufacturing sector. Once known for its spices, tin, and rubber, Malaysia now has a diversified secondary sector comprising textiles, chemicals, steel, transport equipment, and other products. The electrical and electronics (E&E) sector has been at the centre of this structural shift, as it is the largest subsector in terms of employment, investment, output and export earnings.<sup>1</sup>

Drawing inspiration from Japan and Korea, the Malaysian state has intervened with the aim of fostering rapid industrialization and economic development. However, while it has been successful at encouraging the growth of the manufacturing sector - so-called structural transformation - it has been less successful at fostering industrial-technological transformation, or upgrading.<sup>2</sup> Its manufacturing sector is narrowly-focused on a small number of products with relatively low levels of local content sold to a limited number of clients. The structure of the sector is 'asymmetrical', with the most sophisticated activity being carried out by multi-national corporations with few links to an under-developed core of local supplier firms.<sup>3</sup>

To date, research on industrialization in Malaysia has sought to establish how investment flows and firm capabilities have been influenced by national policies and priorities. International comparisons show that the country has good basic infrastructure and access to capital, a moderate bureaucratic burden and tax rate, and relatively high labour productivity.<sup>4</sup> In large part, this setting has proven successful at attracting and retaining significant amounts of foreign direct investment.

In contrast, the state's attempts to promote strategic industries, foster domestic entrepreneurship, and encourage technology transfer have been markedly less successful.<sup>5</sup> These objectives have been hampered by a dual commitment to economic growth on one hand and the inter-ethnic redistribution of wealth on the other. Heavy industrialization was pursued by state-owned holding companies on behalf of the Bumiputra community, the development of the electronics sector was sought through foreign direct investment, and in both cases the existing base of predominantly Chinese-manufacturing firms was bypassed.<sup>6</sup> This structural issue has been compounded by a range of technical issues, including: the pursuit of high technology sectors with little regard to their underlying capability requirements; a lack of state capacity for detailed assessment and follow-up of investor commitments in return for incentives and rebates; and an under-investment in scientific and technical manpower as well as research and development.<sup>7</sup>

Malaysia's E&E sector is essentially concentrated in three firm clusters, each with its own product specializations, technological capabilities, network dynamics, and local institutional environment. In the north, Penang houses market-leading semiconductor and industrial equipment multinationals, as well as a number of contract electronics manufacturers and many supplier firms, including some local firms with world-class capabilities in the process automation and technology provision sectors.<sup>8</sup> The Klang Valley, comprised of Kuala Lumpur and the surrounding state of Selangor, has a large number of firms in the consumer electronics, semiconductor, and domestic appliance

sub-sectors.<sup>9</sup> Johor, in the south of the country, houses the third concentration of E&E firms which includes a large number of contract electronics manufacturers, as well as consumer electronics and computer peripheral producers.<sup>10</sup>

Available comparative data shows that multinational firms carry out tasks of different intensity in the three locations, and local firms have differing levels of technological capabilities and network strength.<sup>11</sup> Thus, while providing important elements of an overall assessment, a uniquely national-level perspective does not explain these intra-national differences in firm dynamics and technological capabilities.

Research from a variety of disciplines argues that economic activity can be shaped by surrounding formal and informal institutions. In particular, research on countries with multi-levelled systems of government such as China, India, Brazil, and Mexico shows that by selectively implementing national decrees, drawing on ties with local social actors, and - where necessary - innovating, subnational governments can be crucial intermediaries in state-led economic transformation drives.<sup>12</sup>

In addition, the tendency of skill-intensive industries to 'cluster' in specific sites to benefit from external economies requires greater attention to location-specific needs, something sub-national governments may be better placed to do. Important policy approaches encompass providing a hospitable local environment for business as well as undertaking proactive measures to: encourage networking among firms and supporting institutions; address market failures; and tackle collective action dilemmas.<sup>13</sup> Indeed, because of their greater proximity to firms, sub-national states may be more able to meet the requisite institutional capacities that Doner identifies as necessary for fostering upgrading, which are: consultation among actors involved in the effort; credible commitments to undertake necessary efforts; and monitoring to ensure follow-up.<sup>14</sup>

Given that Malaysia is a federation, with a central government and thirteen state counterparts, an examination of state agency and policies at the sub-national level may shed light on the differential development of each of these firm groupings. While Malaysia's constitution assigns the bulk of responsibilities and revenue sources to the federal government, state governments do carry out important tasks relative to economic policy in general and industrialization in particular. They are responsible for land development, the provision of local services such as water, and the maintenance of basic infrastructure.<sup>15</sup> Through economic development corporations, state governments are also charged with promoting industrialization and diversifying the economy.<sup>16</sup> In addition, they carry out economic planning, investor liaison, and training tasks.

Research carried out on Penang has documented how its state government and economic development corporation played a role in promoting the development of its electronics sector through: implementing targeted investment drives; providing specialized infrastructure; making strategic investments to diminish risk; addressing market failures regarding skilled workers; and seeking to foster inter-firm linkages through consortia.<sup>17</sup>

The role of the state governments of Selangor and Johor in fostering the emergence and development of their electronics sectors is less well-researched. That said, establishing the role

played by the Selangor state government is complicated by its proximity to the Kuala Lumpur federal territory, which has benefited from a disproportionate amount of federal funding.<sup>18</sup> In particular, under the Mahathir administration, Kuala Lumpur received formidable amounts of federal funding for: upgrading its seaport, airport, and public transport system; specialized infrastructure such as high technology parks; and strategic investments in the auto, steel, and IT sectors.<sup>19</sup> In addition, Kuala Lumpur houses the headquarters of all federal government agencies, including business support agencies, credit providers, and venture capital firms.

In contrast, Johor, like Penang, is far removed from the Klang Valley, offering an interesting case for research on the issue of sub-national agency. Up until the launching of the Southern Johor Economic Region in 2006, the state had not been singled out for priority investment by the federal government. And, as with its Penang equivalent, the state government has formulated its own policies for economic development, even to the extent of promoting cross-border investments with Singapore and Batam in Indonesia. Johor also boasts a proactive state economic development agency that has moved to provide industrial parks, invest in new sectors, promote local entrepreneurship, and address market failures. Its achievements include: establishing and operating Malaysia's largest private health-care provider; employing some 65,000 people through a network of almost 300 companies including 8 listed on the KL stock exchange; and fostering a stable of more than 60 local SMEs including 10 with a pre-tax profit of more than RM 1 million.<sup>20</sup>

This paper will therefore focus on Johor, seeking to establish how state government organizations and policies have, within the overall national policy context, shaped the emergence and subsequent development of its electronics sector. This paper will draw on: official figures, including Malaysian Standard Industrial Classification data from the Department of Statistics; relevant secondary sources; as well as a number of interviews with electronics firms, business associations, and state government officials in Johor and Singapore over the period May 2010- September 2011.

Following this introduction, this paper has five parts. Part two will put forward the theoretical approach used to analyze the Johor case. Part three will use this framework to analyze the electronics sector in the state, notably: its firm structure; the degree to which local technological capabilities have been acquired; and the existence, if any, of inter-firm networks. Part four will analyze how and to what extent state government organizations and initiatives have provided an enabling and supportive environment for electronics sector. The fifth and final section will put forward the paper's principal conclusions.

## **Theoretical approach**

A cursory examination of a nation's economy shows that its industries are not evenly distributed throughout its territory but, rather, concentrated in specific locations. Work from a variety of disciplines argues that there is a reason for this, as there is a relationship between economic activity and the institutional context within which it is carried out.

Economists such as Marshall argue that firms tend to cluster in specific locations as they benefit from externalities - or spill over effects - that accrue to all firms in the group. These can be traded or untraded. Traded interdependencies refer to transactions between firms such as specialized suppliers which will - through higher quality inputs, quicker delivery times, and lower prices - increase the performance of all firms in the cluster. Untraded interdependencies are more intangible and include benefits such as more opportunities for the creation of consortia, or the exchange of ideas and techniques.<sup>21</sup>

Others have studied the long-term effects of collaboration between firms in the same cluster. They argue that when firms with similar levels of technological capability work collaboratively to dissect and parcel out the production process, they can benefit from 'speciation'. This results in deepened knowledge and capabilities which, in turn, allows the group as a whole to benefit from gains in efficiency. High levels of trust between client and supplier firms can also allow greater levels of product and process technology to be transferred, which also increases the latter group's innovative potential. However, these relations do not occur automatically and are usually dependent on adequate levels of social capital.<sup>22</sup>

In turn, economic geographers argue that local customs, traditions, and attitudes can support economic growth and innovation through generating and maintaining communal attitudes on issues such as product quality, business practices, and inter-firm collaboration. They argue that the local institutional environment can shape economic activity and, in some cases, contribute to the success of particular firm groups.<sup>23</sup>

One comprehensive approach to analyzing a region's ability to provide an environment conducive to innovation and manufacturing competitiveness is Regional Innovations Systems (RIS). Like its sibling, National Innovation Systems, Regional Innovation Systems is influenced by political economy and evolutionary economics. However, its focus on the sub-national level has also meant that it is influenced by economic geography with its sensitivity to the role of location and distance. Research using this approach has, to date, been largely confined to Western Europe.<sup>24</sup> Regarding Asia, some work has been done in Japan, Korea, and Malaysia, but little has sought to compare and contrast experiences from - or within - different countries.<sup>25</sup>

For the purposes of this paper, a region is defined as 'a meso-level political unit set between the national or federal and local levels of government that might have some cultural or historical homogeneity, but which at least ha[s] some statutory powers to intervene and support economic development, particularly innovation'.<sup>26</sup> Thus, for the RIS school, the term 'region' has uniquely sub-national applications, as opposed to its cross-national connotations in international relations or mainstream economics.

The RIS approach focuses on innovation - which is defined as the 'commercialization of new knowledge in respect of products, processes, and organization'. In addition, this definition stipulates: that the knowledge developed needs to be used in the market; and innovation is not just the development of entirely new products, but also includes (often small) improvements in existing products or processes.<sup>27</sup>

In essence, the RIS approach focuses on the ways in which firms relate to each other on one hand, and with the surrounding institutional context on the other. Its starting point is that firms do not possess all capabilities for effective creation or absorption of knowledge in-house. Rather, much of their competitive advantage hinges on being able to effectively access knowledge generated outside, through contact with: other firms; organizations such as universities, business consultants, or research institutes; or collective facilities such as open laboratories. Figure 1 depicts a firm and the context within which it operates, breaking down the surrounding context into sub-groups of institutions, infrastructure, and incentives.

The wider definition of innovation means the RIS approach does not centre solely on organizations such as research institutes and universities. These organizations are fundamental for certain types of knowledge, but the RIS approach goes beyond them to assess all parts of a region's economic and institutional infrastructure and how it creates, absorbs, and then circulates knowledge. A context that has more opportunities for firms to network among themselves as well as connect with surrounding organizations - which are, in turn, connected, dynamic, and attuned to firm news - will be more conducive to innovation.





Source: Andersson and Karlson 2004:12

An RIS is made up of two discrete aspects<sup>28</sup>:

- The regional production structure this includes firms and any networks that bind them together.
- The regional supportive infrastructure this encompasses all institutions that support economic activity and innovation, such as government agencies, research institutes, universities, technology centres, credit providers and venture capitalists, and business associations.

While a given region may have a mass of firms and an array of organizations, there needs to be interaction and communication within each of the two aspects as well as between them.

The RIS approach differs from more market-oriented approaches such as Porter's cluster theory, in that it starts from the basis that many of the more productive aspects of agglomeration such as the generalized diffusion of knowledge, collective efficiency, and collaboration do not occur automatically. On the contrary, a variety of market failures may impede firms from joining networks, benefiting from the diffusion of knowledge, or engaging in upgrading.

For example, many of the conditions that allow positive externalities to accrue may be underdeveloped if left to market forces alone. The free-riding problem - namely that individual rationality differs from collective rationality - means that firms will under-invest in non-excludable public goods such as a skilled workforce, basic research and development, collective facilities, and a regional 'brand name'. Furthermore, collective action failures may mean that the negative aspects of agglomeration such as relationships characterized by low levels of trust, competition on price, or labour poaching can arise, undercutting the potential for collaboration.

The demand for 'knowledge-generating' services may be too small, unarticulated, or dispersed to warrant a private sector response. This is particularly liable to occur in new industries, where a market has yet to be created. A private sector response is more likely to emerge once demand is visible and information on pricing is available - by which time 'first-mover' advantage may be lost.<sup>29</sup>

In addition, information asymmetries mean that producers and consumers do not always have the necessary elements regarding prices, products, markets, or technology to make informed decisions. Presence in a cluster of firms does not automatically guarantee access to information. Research from emerging clusters indicates that knowledge is distributed through firm networks unevenly, with better-connected firms benefiting and other less-established ones being excluded.<sup>30</sup>

Last, the acquisition and absorption of new technology by firms is not straightforward. While markets are adept at giving signals for small changes in production and investment, they are not good at providing information on returns that can accrue from the adoption of 'paradigm-shifting' technology. Thus, existing prices may not be representative of potential profits, with the result that firms can refrain from investing in potentially lucrative activities or seeking to work in consortia.<sup>31</sup>

The rationale behind establishing and strengthening a Regional Innovation System (RIS) is thus to increase the innovative potential of firms by correcting market failures, overcoming collective action

dilemmas, and increasing the opportunities for collaboration and inter-firm learning. However, while it is tempting to invest in infrastructure, institutions, and incentives, policy-makers need to bear in mind the ability of existing organizations to successfully absorb additional funds. Experiences from regional governments in Europe testify to the 'regional innovation paradox', which refers to the inability of these entities to usefully manage additional funding due to incomplete networks, low levels of capacity, and unformed plans.<sup>32</sup>

Thus, the role of a regional government can be seen to be one of a facilitator. More than providing a vast array of additional services, the regional government can act as an 'intelligent cell', compiling information, establishing development priorities, making use of existing national institutions and polices, promoting communication between the different parts of the RIS, and, where necessary, tackling market failures directly. While the creation of a functioning RIS is a long-term effort, it is very hard for competitors to emulate as, while physical infrastructure and financial capital can be provided relatively easily, social capital takes longer to accumulate.

RIS' focus on the context within which firms operate and - in particular - the role that state organizations and formal and informal institutions play in shaping firm capabilities make it wellsuited for policy-oriented research. However, work by Markusen on high technology industrial districts in the United States, Japan, Korea, and Brazil suggests two ways in which an analysis of regional-level economic activity can be further deepened.<sup>33</sup>

First, it is important to establish not just the extent of contact between firms, but also how firm networks are articulated and - in particular - the power relations between their members. Lead firms - in this case electronics multinationals - shape firm networks through their decisions regarding: what to outsource; where to locate production functions; and what requirements to make of supplier firms.<sup>34</sup> Thus a development model that hinges predominantly on foreign direct investment may find little room for agency.

Second, while the meso-level dimension is important, firm clusters and local organizations may be integrated into networks that go beyond the boundaries of the region in question. Indeed, the semiconductor sector was one of the first industries to be internationalized and manifest a 'spatial hierarchy of production'.<sup>35</sup> Thus, firm activity in a particular location can be differentiated by its local or international orientation. Firm groupings with more local orientation will offer greater opportunities for outsourcing, interchange, and collaborative enterprises.

Markusen proposes a typology of clusters or 'industrial districts' taking into account the following attributes: structure; nature of inter-firm collaboration; local or international orientation; existence of supporting services; and role of local government. She proposes three models, namely: Italianate, Hub-and-Spoke, and Satellite Platform.<sup>36</sup> In addition to their distinct characteristics, she argues that they each have different prospects for innovation.

In many ways, the 'Italian' type of industrial district is the 'ideal type' of a dynamic region. It is epitomized by the small, innovative firm clusters found in the 'Third Italy' that, in addition to enjoying agglomeration economies, receive consistent support from local governments and trade associations that: provide shared amenities; attempt to address collective action dilemmas; and promote the region. Firm clusters in regions such as Silicon Valley are argued to possess similar characteristics.<sup>37</sup> Markusen argues that the long-term prospects of these clusters are good if local firms can generate and sustain sufficient levels of innovation and dynamism. Of key interest to regional policy-makers, the range and depth of interdependencies makes economic activity deeply-rooted and hard to relocate.

The Hub-and-Spoke model is led by one or more lead firms which, in turn, sustain a collection of supplier and supporting services locally as well as in other locations. These clusters may be characterised by long-term and stable relationships between firms along the same value chain, but not between lead firms. Firms in a hub-and-spoke industrial district are unlikely to have shared facilities or engage in collective learning, although lead firms may provide technical support and inputs to supplier firms. Regional government initiatives tend to focus on catering to the interests of lead firms and acting as an intermediary with higher levels of government. It is possible that a regionally-specific culture may develop as firms and workers come to identify with the local context, although workers will tend to identify with lead firms first rather than the district in question. In terms of long-term prospects, the cluster's fortunes are dependent on the fate of the lead firm or firms. However, if these firms prosper and generate enough externalities, they may attract other more dynamic and independent firms, thus helping diversify the region's economy.

The Satellite Platform model consists of a collection of branch plants of firms. These affiliates carry out tasks of varying sophisticated, but obey decisions made at firm headquarters located elsewhere. Consequently, there is relatively little inter-firm collaboration within the cluster, and commercial and inter-personal links are almost all external. Technological learning, social relations, and professional progression take place within firms, meaning there is very little development of a locally-rooted culture. While regional governments may supply infrastructure and incentives, they do not promote inter-firm exchanges or the fostering of untraded interdependencies. Satellite platforms do result in jobs and income, but the lack of a unique institutional context or locally-rooted culture means that comparative offerings can be produced by competing regions.

These models are ideal types, and specific regions may possess a combination of traits. However, these characteristics are dynamic as firm capabilities and the local institutional context evolve over time. A progression from say, a Satellite Platform to an Italianate cluster is not automatic, but the latter offers a host region more stability and value-added tasks than the former. Consequently, the challenge for regional-level policy-makers is to develop policies to promote the acquisition of more territorially-rooted competencies and attributes.

The next two sections will analyze Johor's Regional Innovation System with regard to the E&E sector. The first will assess available information concerning the number, size, ownership, and technological capabilities of firms, as well as their networks and external/internal orientation. The subsequent section will look at Johor's supportive institutional infrastructure, namely the incentives, infrastructure, and institutional context within which firms carry out their operations.

# The Electronics Industry in Johor: The Regional Production Structure

After a brief introduction to Johor and its economy, this section will analyse the state's electronics sector, paying particular information to: its size, structure, ownership, and orientation; the level of technological capabilities and the nature of their acquisition; and the extent of networking between firms. In order to place these characteristics within the Malaysian context, references will be made to the electronics sector in Penang where relevant.

Johor's 19,200 sq. kilometres of flat, fertile land has meant the state has long been associated with the production of primary products for export. Its state's initial settlement in the 1840s was driven by the conversion of primary forest to the cultivation of pepper and gambier.<sup>38</sup> In the early 20<sup>th</sup> century, rubber replaced these commodities and was, in turn, superseded by palm oil. Today, Johor is the largest producer of palm oil in Peninsular Malaysia, and also is an important exporter of rubber, pineapples, coconuts, cocoa, and coffee.<sup>39</sup>

Despite formidable levels of income accruing from agriculture, the Johor state government began to foster manufacturing in the 1970s - notably in steel and shipping - in an attempt to diversify the economy. Since the 1980s, the manufacturing sector has benefited from sustained levels of foreign direct investment, particularly in the electronics sector, and Johor is now one of Malaysia's three main centres.

Over the past three decades, Johor's economy has undergone a structural transformation. In 1983, the state's primary, secondary, and tertiary sectors accounted for 33%, 28%, and 39% of GRP, respectively. In 2008, the primary sector accounted for 8.3% of GRP, and the secondary and tertiary sectors accounted for 44.1% and 47.6% of Johor's regional domestic product, respectively.<sup>40</sup>

The state's manufacturing sector currently consists of some 4,700 firms and employs some 330,000 people. It is diversified, with plastic products, furniture, food processing, and petroleum products constituting - along with electronics - the most important sub-sectors. The electronics sector - defined here as comprising components producers, office and computing machinery, and consumer electronics - accounts for approximately 20 percent of total manufacturing employment.<sup>41</sup>

In geographic terms, the capital of the state, Johor Bahru, and the neighbouring district of Kulaijaya constitute the centre of the electronics sector. However, there are small groups of firms in the smaller urban centres of Batu Pahat, Muar, and Kota Tinggi, each with at least one flagship firm.<sup>42</sup>

Regarding ownership, available data indicates that the sector is largely foreign-owned, with the largest number of firms having headquarters in Japan (41%), followed by Singapore (35%), Malaysia (18%), and the United States (6%). The sector as a whole is largely externally-oriented, with 78% of firms having been exporting for more than 5 years. The most common destinations by order of importance are North America, Singapore, Japan, and the European Union. However, there are different patterns, with all foreign-owned firms exporting at least 80% of their production, and no local or joint-venture firms exporting more than 50% of their production - thus indicating some level of linkages between local and foreign firms.<sup>43</sup>

Table 1 has a breakdown of the electronics sectors in Johor and Penang by category, number of firms, employees, and average size for 2008. In Johor, the electronics sector accounts for some 65,000 employees and 127 firms. The components sub-sector is the largest, accounting for 30,000 workers in more than 70 firms. This is followed by: office and computing machinery with 19 firms and 14,000 employees; television and radio receivers with 29 firms and 11,600 employees; and television and radio transmitters with 6 firms and some 8,300 employees.

Table 1 - Breakdown of the Electronics Sectors in Johor and Penang by MI	SC
Category, Number of Firms, Employment, and Average Size (2008)	

<b>Johor</b> (2008)	Code	Size	Firms	Employment	Avg Employees
Office, accounting, computing machinery	300	Small Large	3 16	78 13,941	31 899
Electronic valves, tubes, components	321	Micro Small Medium Large	3 31 12 28	7 1,990 1,026 28,332	2 64 87 1027
Television and radio transmitters	322	All	6	8,287	1381
Television and radio receivers, sound /video systems	323	Small Large	22 7	770 10,830	35 1548
Total for Electronics			127	65,264	514

<b>Penang</b> (2008)	Code	Size	Firms	Employment	Avg Employees
Office, accounting, computing machinery	300	Small Large	3 12	93 23,078	29 1,956
Electronic valves, tubes, components	321	Small Medium Large	26 11 37	836 1,427 66,887	32 127 1,833
Television and radio transmitters	322	All	4	3,899	975
Television and radio receivers, sound /video systems	323	Small Large	10	7,988	799
Total for Electronics			103	104,206	1,012

#### Source: raw data supplied by the Department of Statistics of Malaysia

The bulk of the employment is provided by a number of large firms across the four electronics subsectors. The television and radio receiver manufacturers have the largest firms with 7 large firms employing an average of 1,500 workers each, followed by the electronics components producers with almost 30 companies employing some 1,000 workers each.

Penang's electronics sector is significantly larger in employment terms, with more than 100,000 workers in about 100 firms. As with Johor, the components sub-sector is by far the largest, in this case comprising some 69,000 workers in 74 firms. The next most important sector is office and computing machinery with 23,000 employees in 15 firms. The consumer electronics sub-sectors are significantly smaller, with 12,000 workers in 14 firms, as opposed to Johor's 20,000.

As with Johor, the bulk of employment is concentrated in a number of large firms. In Penang's case, the firms are even larger, with the biggest office and computing machinery and components producers employing 2,000 and 1,800 workers each on average. Conversely, the consumer electronics facilities are smaller in comparison to Johor's.

In Johor, employment in the electronics sector has a whole has undergone a notable reduction since 2000, when the sector employed some 85,000 people. However, the number of firms has increased somewhat, particularly in the components sub-sector. The sub-sector that was most affected was television and radio receivers, whose ranks shrank from 44 firms and almost 39,000 workers in 2000 to 29 firms and 11,000 workers in 2008 - reflecting its declining competitiveness in high-volume, low mix activities. In contrast, the components, television transmitter, and computer manufacturing sub-sectors have expanded slightly. Thus, Johor seems to be seeing an expansion of the more sophisticated sub-sectors as well as more newer and smaller firms.

The electronics sector in Penang has also experienced a contraction in employment, although this has been accompanied by a reduction in the number of firms. The reduction in employment and firm numbers has been largely concentrated in the television and radio receiver sub-sector with some contraction also in the computing machinery sub-sector. However, the components sub-sector has seen a substantial expansion in employment numbers within the same number of firms. Penang is thus witnessing a contraction of the less technologically sophisticated sub-sectors and the expansion of its components sub-sector.

Johor Penang 2000 2008 2000 2008 Emp. Emp. Emp. Firms Emp. Firms Firms Firms 12,400 14,019 **Computing Machinery** 16 19 22 29.818 15 23,171 Components 54 27,695 74 31,355 73 56,767 74 69,149 8,287 7 TV transmitters, apparatus 7 6,087 6 4,452 4 3,899 TV radio receivers, sound recording 44 38,877 29 11,604 28 22,957 10 7,988 Total 121 85,059 65,265 113,994 103 104,207 128 130

 Table 2 - Firm Numbers and Employment by Sub-sector in Johor and Penang

 (2000, 2008)

Source: raw data supplied by the Department of Statistics of Malaysia

Both states have a large number of firms in supporting sectors such as metal-working services, manufacture of general and special purpose machinery, and plastics products. These sub-sectors are sizeably bigger in Johor than Penang, amounting to 906 firms and 65,800 people in the first state and 485 firms and 36,000 people in the second. However, Johor has a more diverse manufacturing sector, and these many of these supporting firms would cater to the steel, oil and gas, and petrochemical sectors.

What can be said about the relative sophistication of electronics firms presently in Johor? Relative to Penang, Johor has a larger presence of consumer electronics firms (television and radio transmitter/receivers, sound/video systems) as opposed to the more sophisticated and challenging electronics components and computing machinery sub-sectors. In addition, available evidence suggests that firms in Johor in these sectors concentrate on less technologically sophisticated items such as passive components in the case of the former and faxes, printers, and photocopiers in the case of the latter.

With regard to the production of electronics components, Penang has a group of some 10 semiconductor producers (Intel, AMD, Fairchild, and National Semiconductor inter alia) while Johor has one established semiconductor firm, STMicroelectronics. STMicroelectronics has its Asia-Pacific headquarters as well as wafer fabrication and design centre in Singapore, with semiconductor assembly operations in Johor.<sup>44</sup> Qimonda, a subsidiary of Infineon, established a facility in Johor but subsequently went out of business in 2009. Other components manufacturers in Johor

tend to specialize in passive components such resistors, inductors, capacitors, or magnets.<sup>45</sup> As a result, sophisticated tasks in the semiconductor sub-sector such as R&D or design are not carried out by flagship firms or specialized supplier firms such as the case of Altera in Penang.

Like Penang, Johor has a large body of contract electronics manufacturers (CEMs) that provide integrated manufacturing, logistics, and often design services to flagship firms in the component, computing, and consumer electronics sectors, leaving the latter to concentrate on R&D, marketing, and sales. While a great deal of technologically-sophisticated activities can be carried out by CEMs, available evidence suggests that these firms concentrate the more sophisticated tasks in regional headquarters in Singapore - and to a lesser extent Penang - operating feeder plants in Johor.

Thus, Flextronics, one of the leading CEMs specializing in electronic displays, printed circuit board (PCB) assembly, and hard disk drive cards, has facilities in Penang and Johor, but is headquartered in Singapore. The same applies for Celestica, the Canadian CEM, which has two facilities in Johor - one for PCB assembly and testing and another for cartridge assembly, filling, and packaging - that are linked into its facility in northern Singapore.<sup>46</sup> Venture Corporation and Wearnes Electronics are structured in a similar fashion, with headquarters in Singapore and production facilities in Johor.<sup>47</sup> However, there is more diversity among the smaller CEMs. Thus, for example, SRX Global is an Australia-based CEM which handles its global procurement from its Johor plant, and Shima Electronics is Japanese with facilities in China as well as Johor.<sup>48</sup>

Despite Johor-based CEM operations tending to consist of less technologically-intensive tasks than their Singapore or Penang equivalents, there are some positive indications. For example, Flextronics has located an integrated procurement centre in Johor, and has also established facilities for new sub-sectors such as solar panel assembly and medical consumer products. However, the medical consumer product operation seems to follow the same pattern as its other CEM operations, as the design centre is located in Beijing and the final assembly of the components takes place in its Singapore facility.<sup>49</sup>

The large disk drive manufacturers in Johor have a similar structure to the CEMs. For example, Western Digital has a large manufacturing plant in Johor, with R&D centres in Penang and Singapore.<sup>50</sup> Seagate manufactures aluminium substrates for the assembly of hard disk drives in Johor, but has a technology centre for slider manufacturing in Penang and a hard drive design centre in Singapore that is the only one of its kind outside of the United States.<sup>51</sup>

Regarding other segments of the office and computer machinery sub-sector, Johor also houses a significant group of manufacturers of computer peripherals. Firms such as Hewlett Packard, Brother, Epson, and Tektronix produce printers or inkjet cartridges. Other products in this sub-sector that are made in Johor include CD-ROMs, keyboards, and optical mice and are produced by firms such as PCA, Fujitsu, and Optosensors.<sup>52</sup>

The other significant firm grouping in Johor consists of producers of consumer electronics such as CD and DVD players and recorders, camcorders, televisions, projectors, and remote controls. Notable examples include Panasonic, Mitsubishi, Sharp, Pioneer, Shinwa Technology, and Hitachi.<sup>53</sup>

The presence of flagship firms has, in turn, attracted a cohort of firms in supporting industries, particularly automation and engineering technology. Classic Advantage is headquartered in Singapore, and has had facilities in Johor since 1994 where it manufactures precision engineering and plastic injection moulding equipment. First Engineering makes precision moulds and plastic components, and is also headquartered in Singapore with facilities in Johor, India and China.<sup>54</sup> Sunningdale Tech, also headquartered in Singapore, is following a similar trajectory.<sup>55</sup>

A sizeable number of small-scale supply firms specializing in machining and equipment supply have also relocated from Singapore to Johor. Taking advantage of the well-developed logistics sector connecting the two territories, this 'offshoring' model has been popular with smaller firms, who relocate their manufacturing operations to Johor, while retaining a sales office in Singapore.<sup>56</sup>

Regarding the emergence of local firms, the absence of large numbers of semiconductor firms means that there has not been an emergence of a core of automated production equipment producers or a subset of specialist designers or producers of semiconductor test systems (the Penang-based equivalents would include Pentamaster and LKT for the former, and Elsoft and Vitrox for the latter).

However, there are examples of local firms in Johor that have begun to climb the value chain, notably that have moved from the plastics sub-sector into providing CEM services particularly for the consumer electronics sub-sectors. VS Industry is a Malaysian firm that supplies to some of the larger Johor-based flagships such as Sharp, Brother, and Panasonic, as it makes vacuum cleaners, remote controls, and faxes, and also does PCB assembly, sub-assembly, and R&D for remote controls.<sup>57</sup> Toyoplas is another local firm that is following the same path, moving from providing plastic injection moulding to firms such as Toshiba and Epson into CEM.<sup>58</sup> ATA Industrial also began supplying plastic injection moulding services to Hewlett-Packard, Dyson, and Kenwood, before moving into the precision engineering sector. It maintains its headquarters in Johor Bahru, and only has a sales office in Singapore.<sup>59</sup>

What can be said about technological capabilities and the degree of networking between firms in Johor and how they compare to elsewhere in Malaysia? A survey of 113 electronics firms carried out in Penang and Johor in 2004 gives some insight into the differential level of capabilities between the two firm groupings.

Regarding foreign-owned and local firms in Johor and Penang, figures 2 and 3 depict the relative level of: skills intensity (skilled and professional personnel in work-force); human resource processes (training expenditure, HR practices and facilities); process technology (age of equipment, quality and process control); and expenditure in product R&D (percentage of sales).



Figure 2 - Capabilities in Local Firms in Johor and Penang

Source: Rajah Rasiah "Industrial Clustering of Electronics Firms in Indonesia and Malaysia" in Production Networks and Industrial Clusters: Integrating Economies in Southeast Asia, edited by Ikuo Kuroiwa and Toh Mun Heng, Singapore: ISEAS 2008.

At the most aggregate level, foreign firms in both states have higher levels of skills intensity, HR processes, process technology, and investment in product R&D than local firms. However, foreign firms in Penang score consistently higher across all categories than do their Johor-based counterparts. Of particular interest is the fact that while R&D expenditure of firms in Penang is low, in Johor it is almost non-existent D lending credence to the assertion that firms there are almost exclusively dedicated to production. The pattern is largely repeated with regards to local firms. However, the gap in capabilities between local firms in Penang and Johor is more marked with regards to skills intensity and process technology. While R&D levels are lower for local firms in Penang than their foreign counterparts, they do invest some resources in this area, whereas Johor-based local firms invest almost nothing.



Figure 3 - Capabilities in Foreign Firms in Johor and Penang

Source: Rajah Rasiah "Industrial Clustering of Electronics Firms in Indonesia and Malaysia" in Production Networks and Industrial Clusters: Integrating Economies in Southeast Asia, edited by Ikuo Kuroiwa and Toh Mun Heng, Singapore: ISEAS 2008.



### Figure 4 - Network Cohesion in Johor and Penang

Source: Rajah Rasiah "Industrial Clustering of Electronics Firms in Indonesia and Malaysia" in Production Networks and Industrial Clusters: Integrating Economies in Southeast Asia, edited by Ikuo Kuroiwa and Toh Mun Heng, Singapore: ISEAS 2008.

Figure 4 depicts the ranking on a Likert scale of the local supplier base and the role of industry associations in Johor and Penang by both local and foreign firms. Both local and foreign firms in Penang gave higher scores to their local suppliers and industry associations than their Johor counterparts. That said, in neither case were the scores particularly high.

More recent research supports the lack of inter-firm links in Johor and the limited development of new products. Figure 5 depicts the different ways in which firms in Johor learn new process and production systems. Most firms acquire new knowledge through their own efforts (50%) or by purchasing it from technology suppliers (39%). Adapting or reverse engineering competitors' products is another popular method of acquiring new capabilities (32%). Only a minority of firms develop additional capabilities collectively (17%) or through an intermediary (5%). A related survey guestion found that more than 70% of firms in Johor were not involved in product development.



Figure 5 - Source of New Process and Production Systems in Johor

Source: Background Industrial Surveys for SJER Development Master Plan Study, RMA Perunding Bersatu 2006.

This review of the Johor electronics sector in terms of its size, structure, sub-sectoral specialization, orientation, technological capabilities, and degree of networking indicates that: relative to Penang, it specializes in less technologically-demanding sub-sectors; and of the various models put forward by Markusen, it more closely approximates the Satellite Platform model.

Thus, production in Johor is led by a large number of foreign-owned firms who support operations elsewhere. The groupings' external orientation means that many strategic decisions are made offshore, and opportunities for collaboration and interchange at the local level are limited. For this same reason, there is little development of a culture rooted in the local context or of a regional identity.

This tendency may also be aggravated by the prevalence of CEMs and consumer electronics firms, whose business model seems to entail fewer opportunities for downstream operations than more specialized operations such as those in the semiconductor and more sophisticated areas of

computing machinery production. The limited degree of interchange between firms seems to have also precluded: the emergence of developmental firms such as Intel or Motorola as observed by Rasiah in Penang; or significant opportunities for collective learning and the ensuing gains from speciation.<sup>60</sup> That said, the fact that there is some degree of linkages between the biggest firms and supplier firms means that the firm grouping could demonstrate more characteristics of a Huband-Spoke model in the future.

# The Regional Supportive Structure

Having set out Johor's regional production system, this section, in turn, will look at its supportive infrastructure, namely those organizations in the state that support economic activity and innovation. The key focus will be on how the state government and its organizations and policies have shaped the emergence and subsequent development of the electronics sector. Thus, the first part of this section will look at the structure of the Johor state government and the evolution of its policy frameworks. From there, it will look at how and to what extent the state's various organizations implemented policies to provide an enabling environment for growth, as well as pursuing a range of market-complementing measures. In addition, the role played by federal government agencies, business associations, and the private sector will be brought in where appropriate.

## Key State Government Organizations in Johor

As mentioned in the introduction, Malaysia is a relatively centralized federation, with responsibilities and revenue sources geared strongly towards the federal government. Beyond the normal responsibilities for external affairs, defence, and finance, the Constitution attributes to the federal government aspects such as education, labour, and health. In turn, state governments are responsible for: land management; agriculture and forestry; and local government and services (maintenance, lighting, markets). In addition, the responsibilities for water, housing, as well as town and country planning are listed as shared responsibilities.<sup>61</sup> Furthermore, state governments have come to assume informal responsibilities for tasks such as economic planning, promotion and investor liaison, and training.

Insofar as financing, the Constitution attributes the bulk of revenue sources to the federal government, which receives some 90% of total government revenue. State governments are dependent on smaller, less flexible revenue sources such as those accruing from land, forestry and mines, as well as entertainment. In addition, state governments are forbidden from imposing taxes or taking out loans without federal government approval. The revenue of state governments is supplemented by a series of federal grants.<sup>62</sup> However, state governments can and do create subsidiaries with the aim of generating profits to cross-subsidize other activities.

With regards to Johor, its state government has an illustrious tradition in Malaysia. Emerging in the 1850s, it was one of the first and most active among what would be the constituent units of the Malaysian Federation. Among other things, by the 1890s, the Johor state government had already

established its own army, navy, railway as well as health and education system. Under the British, the territory was ruled indirectly, meaning that many of its pre-existing governance structures were preserved and absorbed into the colonial state.<sup>63</sup>

Some of this tradition of independence remains today. Johor is one of only a few states in the country to retain its own civil service. The Johor Civil Service (JCS) traces its origins back to the 1850s, and counts the founder of the country's biggest political party as well as a Prime Minister among its alumni. This civil service is closed, requiring its members to be Malays from Johor.<sup>64</sup> At present, it has some 170 members, who helm all key positions in the state government - beginning with Assistant District Officers who handle land matters all the way up to the State Secretary, which is the highest administrative post in the state.<sup>65</sup> The independence of the JCS is augmented by the state's own civil service commission, which is responsible for appointing and training all professional and technical staff. A number of other states in Malaysia ceded this responsibility to the federal government, entailing a significant degree of central control over key positions.<sup>66</sup>

There are a number of key organizations responsible for the formulation of economic and industrial policy. The first is the State Legislative Assembly, which is comprised of the elected members of the state government, helmed by a Chief Minister chosen by the majority party. The Executive Council functions as a cabinet, bringing together ten assemblypersons from the ruling party and the top three state civil servants. Each member of the Exco has responsibility for one or more of 13 portfolios relating to the conduct of state government business (finance, planning, industry, inter alia). Since the first elections in 1959, the ruling coalition at the national level has also been in power at the state level. Thus, at a macro level, the priorities pursued by the Johor state government have not differed significantly from those of the federal government.

The State Secretary is the highest-ranking administrative officer in the state government. He oversees the work of 10 departments which carry out the key state government responsibilities (Lands and Mines as well as Public Works among others). The agency responsible for policy formulation and development planning is the economic planning unit (Unit Perancang Ekonomi Negara Johor (UPENJ)). Headed by a senior JCS official, this unit monitors international and national trends, formulates sectoral plans, and proposes privatization and revenue-generating initiatives. Regarding planning, the Unit produces five and ten-year plans to coordinate the activities of agencies in the state.<sup>67</sup>

The state government also has a promotional arm, the Johor State Investment Centre (JSIC), which comes under the purview of UPENJ. Also headed by a senior JCS official, the Centre is charged with: marketing Johor overseas; facilitating land, licenses, and permits for investors; and gathering information on local-level issues affecting the business community. Since 2006, the Centre has tended to concentrate more on northern Johor, given the promotion of the southern part of Johor by the federal government.<sup>68</sup>

The Johor state government also has an educational foundation, an Islamic Corporation, and a small stable of statutory bodies.<sup>69</sup> The most significant organization of these is JCorp, formerly called the Johor State Economic Development Corporation. Established in 1968, JCorp began

operations concurrently with the launching of the New Economic Policy, which was geared to eradicating poverty and restructuring society in the wake of the ethnic unrest that shook Malaysia in 1969. Thus, JCorp's organizational objectives mirror these goals, with its corporate mission being to 'spearhead' the movement and positioning of the Bumiputra - or Malay community - in the national economy. As such, JCorp's employees must be Malay, although this requirement is not extended to employees in the majority of its subsidiaries. Its corporate strategy has been to promote industrialization by: developing large industrial estates; making strategic investments; and accumulating assets.<sup>70</sup>

During the first 25 years of its existence, JCorp grew rapidly due to profitable oil plantations, sustained land purchases, and a highly leveraged growth strategy. Starting with a state government loan of RM 10 million and some oil palm plantations in the early 1970s, by 1996, the Corporation was at the heart of a conglomerate with 19 divisions, assets worth RM 7.4 billion, a turnover of RM 2.83 billion, and four firms listed on the Kuala Lumpur stock exchange. Its investments ranged from oil palm plantations to healthcare and from heavy industry to paper production and publishing.<sup>71</sup>

However, JCorp was hard hit by the 1997/98 financial crisis, losing RM 680 million in 1997 and a further RM 630 million the following year. In 1998, its total debt reached RM 10 billion, and it had to liquidate 35 subsidiaries and request federal government help to restructure its debt. Following this, it closed a number of its divisions, sold many offshore holdings, and re-focussed its energies on core business concerns (agriculture, property development, healthcare among others).<sup>72</sup>

At present, JCorp is still a major player in the state's economy, with a stable of more than 280 firms, including 8 companies listed on KLSE, and 65,000 employees in Malaysia and overseas. However, while JCorp used to be seen as the implementation arm of the state government Đ particularly insofar as investor liaison and industrial parks was concerned, its role is increasingly being curtailed. Since 2004, investor liaison functions have been delegated to JSIC, meaning that the twin functions of liaison and land development are now separated. At present, there are discussions about divesting some of the conglomerate's assets to pay off an estimated RM 6.6 billion in debt.<sup>73</sup>

The other key organization in terms of Johor's economic development is the Iskandar Regional Development Authority (IRDA). Established in 2007, IRDA is a federal statutory body charged with promoting the development of the Iskandar Malaysia region, a 2,200 sq km swathe of fronting Singapore. Iskandar Malaysia is one of five growth corridors that the federal government is seeking to promote to promote the development of new industries outside of the country's capital. Unique among these corridors, the rest of which are overseen solely by the federal government, Iskandar Malaysia is jointly chaired by the Prime Minister and the Chief Minister of Johor. As a result, IRDA is comprised of both federal and state officials. However, while it is charged with policy formulation and investor facilitation, IRDA has no implementation capacity and does not supersede the state government of Johor in areas of its competence such as land management or local government.<sup>74</sup>

## **Key Policy Frameworks**

Given Johor's background in agriculture, the first decades of independence were given over to issues of land development. Both the federal and state governments dedicated considerable resources to opening up vast tracts of forest in the eastern part of the state to small-holders. In addition, industrialization was conceived of as a state-led enterprise. Thus, both levels of government invested resources in a range of sectors, including tin processing, steel, ship-building, and palm oil refining. Furthermore, in an attempt to capitalize on some of the cargo being shipped through Singapore, the federal government established the port of Johor to cater to the southern part of the country in the late 1970s.<sup>75</sup>

In the 1980s, commodity prices fell and the state government began to look at industrialization as a method of generating employment and encouraging the growth of more modern sectors. Furthermore, the relative attractiveness of the state was boosted due to the appreciation of the Singaporean dollar as well as the currencies of the other NICs in the wake of the Plaza Accords in 1985 and the withdrawal of their GSP status in 1988.<sup>76</sup> Thus, during the late 1980s and early 1990s, the state benefited from large amounts of manufacturing investment from Singapore, Taiwan, and Japan.<sup>77</sup>

In 1989, in an attempt to understand what these structural changes entailed in terms of manpower and skill requirements, the state released the Economic Plan for Johor (1990-2005). The Plan recommended greater commercialisation of agriculture and accelerating the development of industry. Regarding industry, it recommended focussing on resource-based industries (chemical and petro-chemical) and the E&E sector. In addition, it advocated 'economic twinning' with Singapore; encouraging industrial relocation from Japan and other newly-industrialized countries to Johor; and promoting the state as a growth-pole for the southern part of the country. Furthermore, it advocated attracting more knowledge- and capital-intensive industries in view of predicted labour shortages.<sup>78</sup>

During the early 1990s, Johor's economy grew at 10% p.a., higher even than the national average of 8.7%. This rapid growth as well as changing thinking at the national and state levels led to a new policy framework in 1996, the Johor Operational Master Plan, which was meant to run until 2010. As with its predecessor, the Plan sought to promote structural transformation, although the services sector was added as a target area. This transformation was to be achieved through regional cooperation with Singapore and Indonesia, as well as through promoting Johor Bahru as a 'modern technopolis'. At a more operational level, the Plan recommended fostering 'modern high-value' services, such as food processing, fabricated metal, electrical and electronics, and the chemicals sub-sector - these were to be facilitated by a range of strategic investments in infrastructure and skills provision.<sup>79</sup> This Plan coincided with official announcements that labour-intensive investments were no longer encouraged, and that Johor was seeking to climb the value chain.<sup>80</sup>

At a national level, the Second Industrial Master Plan was released in 1996, prompting a re-think at the state level. Thus, in 1997, the Johor state government released its own Industrial Master Plan. As with its national equivalent, this Master Plan was very influenced by Porter's cluster concept,

which stressed an integrated approach to firm groupings, in particular to promote linkages and higher value-added activities. As with its predecessors, the Plan put forward a range of target activities, in this case 7 manufacturing and 8 service sub-sectors. Regarding the E&E sector, the Plan placed particular emphasis on the development of leading edge capabilities in specific niche areas. More than previously, the JIMP placed emphasis on strengthening the local institutional context within which firms work.<sup>81</sup>

This policy framework remained in place until 2006, when Khazanah, the federal government's investment arm, and the Johor State Government released the Comprehensive Development Plan for Iskandar Malaysia. Aimed to run until 2025, the plan aims to turn the southern portion of the state into a 'strong successful conurbation of international standing'. The thrust is to convert the whole region into an integrated whole as well as to bring it more closely into Singapore's orbit, with the aims of attracting investment as well as capitalizing on spillovers.<sup>82</sup>

The Plan recognizes the state's traditional manufacturing activities such as food and agroprocessing, petrochemical, oleochemical, and E&E. However, it puts forward six new target areas which are to receive additional incentives. These are all service activities running from logistics to finance, and education to creative industries.<sup>83</sup> With this new policy, the emphasis moves squarely away from manufacturing to services as the preferred driver of the economy. Although not stated publicly, the E&E sector is now perceived of as 'a mature industry and too volatile'.<sup>84</sup>

Thus, over the past two and a half decades, the Johor state government's policy frameworks have evolved considerably. From a predominantly agricultural focus, the government first attempted to understand what the observed industrialization occurring meant. Subsequently, the policy framework evolved and placed industrialization at the centre of its developmental goals. However, policy-makers were aware of the emerging short-comings of the state's model of industrialization. Echoing the industry analysis made in the previous section, all plans observed the following characteristics of the E&E sector in Johor: high volume, low mix, and relatively low-value added activities; weak linkages between firms; an under-development of the local SME base; a lack of investment in R&D by firms; and a chronic shortage of skilled workers.<sup>85</sup>

Having set out the evolution of the Johor state government's policy frameworks, the next sections will look at how these organizations and policies influenced the environment within which the E&E sector developed.

## Enabling environment for business:

The key element of Johor's competitive advantage has always been land, particularly in relation to costs and availability in nearby Singapore. Upon its inception, JCorp was given primary responsibility for developing the state's land bank and generating revenue. In line with its mandate, it acquired private land and converted it for industrial use. Its business model with regard to potential investors was based on offering land in attractive locations accompanied by stream-lined business processes, rather than using low cost as an incentive to attract investment.<sup>86</sup> The profits from this were used to cross-subsidize a range of strategic investments in new sectors and, for

a number of years, 10 percent of the JCorp group's profits were given to the state government.<sup>87</sup> This approach is seen most clearly in the development of its biggest and best-known industrial park, Pasir Gudang. In the early 1970s, seeing the long-term potential of Johor Port, the state government and JCorp invested substantial resources in securing land around it Đ which also fronted Singapore. They then pushed for the area to be turned into a free trade zone under their authority, which became the only one of its kind within a port complex in the country.<sup>88</sup>

Pasir Gudang's attractiveness was bolstered by making JCorp the local government authority for the area in 1977. In effect, the CEO of JCorp became the mayor of the city with responsibility for all local government prerogatives. This enabled local government approvals for building plans and fitness, fire safety, and trade licenses to be issued within 24 hours, allowing investors to meet requirements afterwards. In addition, through their responsibility for supplying services such as lighting and maintenance as well as enforcing by-laws, JCorp was able to offer investors a more protected environment for operations.<sup>89</sup> The Corporation, through a property development subsidiary, was also active in the construction of low-cost housing for workers in the Pasir Gudang area, which today has a population of more than 100,000 residents.

Bolstered by federal tax incentives for investors and its location just across the Straits from Singapore, Pasir Gudang filled up over the course of the 1980s - largely with E&E firms, as well as heavy industry and food processing operations. Following this, other industrial parks nearby were opened up and some element of specialization between the parks was introduced. A new park, Tanjung Langsat, was built in 1993, more clearly geared to the palm oil and oil and gas sectors, and JCorp invested in the construction of a port with special facilities for handling bulk cargo and chemicals within the park. JCorp also built an access road (which is a federal government responsibility) between Tanjung Langsat and Pasir Gudang to enable investors to take advantage of the other's facilities.<sup>90</sup>

At this point in time, JCorp now has 30 industrial parks across all of the state's major population centres, and which house more than 1,000 firms. Today, the Corporation is seen to cater more particularly to heavy industry, particularly oil, gas, and petrochemicals. Following previous state government planning, the Corporation acquired sizeable land holdings in the eastern part of the state. However, the Iskandar region has planned infrastructural investments in the west and central part of the state, leaving JCorp ill-placed to capitalize on these facilities.<sup>91</sup> In addition, since 2009, JCorp is no longer has local authority responsibility for Pasir Gudang.<sup>92</sup>

While Johor has been billed as a land-rich state, particularly vis-à-vis Singapore, there are indications that the amount of land available for industrial use is reaching its limit. Planners have been raising this issue since the 1990s, and policy-makers are acutely aware of this situation. This is particularly the case when the conversion of land must be weighed up against its potential for cash crop production. The region's proximity to Singapore also means that land prices have gone up, and in 2009, Johor had the third most expensive land for industrial use in the country.<sup>93</sup>

In addition to land, state governments have traditionally been responsible for water provision, as well as local services. However, since the 1990s, the federal government has promoted the

privatization of many government services which have subsequently been nationalized or placed under the regulatory control of the federal government itself. Thus, sewerage management was privatized nation-wide in 1994 under one private sector concessionaire, Indah Water Consortium. In 2000, following the financial crisis, this company was nationalized under the oversight of the federal Ministry of Finance.

However, the situation regarding solid waste management and water has evolved differently across the states, reflecting distinct opinions regarding the desired role of the federal government. Thus, with regard to solid waste management, the private firm SWM Environment Services has handled solid waste management for the southern part of the country from 1997. As of this year, this operator has been awarded a 22 year concession - under the regulatory control of the federal government. However, the states of Penang, Perak, and Selangor have refused to join this scheme, preferring to retain direct control over this service.

With regard to water, the responsibility for water supply and services was under exclusive control of state governments until 2005 - after which it became a concurrent responsibility. Johor, one of the country's water-richest states, was a pioneer in privatizing water treatment in the early 1990s. In 2000, the state government privatized the entirety of its water supply and distribution to a third party, SAJ Holdings Bhd, under a 30 year concession. Water rates were raised by 40% in 2001 and 30% in 2003.94 In 2009, SAJ Holdings had a debt of RM 3.2 billion and water rates in Johor were the highest in the country - more than three times the cost of water in the cheapest state.95 The Ministry of Finance, through a subsidiary, paid SAJ Holding RM 4 billion for its infrastructure and assumed its debt in 2009, in return for the right to assume responsibility for all water sector infrastructure. SAJ Holdings was awarded a 30 year lease to provide water supply services from that date.96 Thus, Johor has opted to relinquish control over its water system and has seen its competitive advantage erode in this aspect.

The Iskandar Malaysia initiative has brought an element of order and vision for the future of the state. Under this plan, the southern region of Johor is divided up into five zones - each with priority sectors, specified incentives and infrastructure, and preferred real estate developers. Thus, land use, infrastructure needs, population centres, and amenities are mapped out for virtually all of southern Johor. And, in the years prior to rolling out Iskandar, the federal government made a number of concessions for large infrastructure projects in the state, namely a second bridge to Singapore in 1998 and the building of a third port, Tanjung Pelepas, in 1999.

With regard to the E&E sector, three zones in particular are meant to house the E&E sector. Two of these encompass the centre of Johor Bahru and the Pasir Gudang/Tanjung Langsat area. The third is in the northern part of Iskandar and centres on the Technology University.97 That said, while these plans are useful for plotting future land use and establishing the lead players, most manufacturing activities will not qualify for many of Iskandar's new incentives. Only companies investing in the target service sector activities and one special zone, Medini, will qualify for benefits such as: as exemptions from equity requirements, foreign exchange rules, and unrestricted hiring of overseas skilled workers. For manufacturing activities, the normal incentives such as tax exemptions and investment allowances are available.<sup>98</sup>

Thus, at first blush, Iskandar Malaysia does not promise a great deal that is new for the E&E sector. Notable large investments in the region have focussed on education, health, property development, oil and gas, and steel manufacture - rather than E&E, which has continued to receive roughly the same level of investment as before.<sup>99</sup> However, it is likely that E&E firms will benefit indirectly from the investments such as upgrading the airport, additional highways, and planned housing developments near industrial parks. In addition, the region has already received investments from six international universities, including one, Southampton, with a large engineering programme.<sup>100</sup>

That said, plans to make the region function as an integrated whole can also disrupt business for the more established residents. Thus, original plans under Iskandar called for all containerized shipping to be routed through Port Tanjung Pelepas in the western part of the state, and for Pasir Gudang's port to specialize in bulk shipping. Objections from firms in Pasir Gudang have been vocal, and this plan has been delayed.<sup>101</sup>

Furthermore, it is not clear that the addition of another layer of bureaucracy that Iskandar entails will make much difference for investors. While IRDA has a service centre that pledges to process applications in 14 working days and get approval in 30 days, its mandate only encompasses planning, promoting, and facilitation tasks. Ultimate authority still rests with state and local authorities, which IRDA must liaise with to obtain approvals.

In addition, the development of the Iskandar region has not been without local controversy. The state branch of the country's largest political party and some opposition parties have expressed concern about land rights for the Malay community, the rolling back of equity requirements in strategic sectors, and the idea of a passport free zone within the Iskandar region where Singaporeans can live and work. National and state level leaders have had to reassure both constituents and investors that these issues will be handled transparently and effectively.<sup>102</sup>

Regarding the overall environment for business, the Johor state government has been proactive in converting land for industrial use and offering investors a variety of parks. In addition, through the establishment of Pasir Gudang and bestowing JCorp with the responsibilities of a local authority, Johor was able to offer investors expedited approvals and reduced lead time. However, this initial model has outlived its utility as Pasir Gudang filled up and investment moved elsewhere. The Johor state government has followed federal government guidelines regarding the privatization and centralization of utilities such as solid waste management, sewerage treatment, and water provision. As such, it has lost control of many aspects of governance and, in the case of water, its competitive advantage in the provision of a crucial input for business has been seriously eroded.

The launching of the Iskandar Malaysia region has seen significant investment in physical infrastructure and entails closer federal government attention - which may or may not be helpful. In addition, the Iskandar Malaysia concept has raised political issues about ownership and equity requirements that may generate opposition. The E&E sector looks likely to benefit indirectly through investments in physical infrastructure rather than through any targeted incentives per se.

## Broker policies:

Beyond the provision of land and utilities, as well as investor liaison services, it is worth analyzing how and to what extent the Johor state government has attempted to foster dialogue and cooperation among firms and the surrounding support infrastructure.

The state government certainly has invested resources in producing developments plans in an attempt to understand economic trends as well as coordinate efforts at a state level. However, while the Economic Planning Unit (UPEN-J) is responsible for producing these policy documents, all major plans have been sub-contracted through a closed tender process to professional consulting firms outside the state.<sup>103</sup>

Curiously, the largest federal university in the state, the Technology University (UTM), has not been involved in any significant capacity in these planning exercises.<sup>104</sup> In addition, while technically very competent and - at times - visionary, these plans were not a result of a consultative process. Their focus is very state-led, with emphasis on public investments in physical infrastructure, human capital, and marketing. As a result, the Plans and their recommendations have not been disseminated outside the state government. In particular, the key business associations in the state were not involved in either the planning process or their follow-up, mirroring the pattern taken by the federal government at the national level.<sup>105</sup>

JCorp, when it was charged with investor liaison, and, subsequently, the Johor State Investment Centre, have undertaken initiatives to market the state and provide initial contacts between firms. JCorp produced a digest for investors for a number of years, and JSIC currently has a directory that covers most of the firms in the state.<sup>106</sup> In addition, investors in JCorp-owned industrial parks are briefed on existing tenants. With Iskandar Malaysia, the level of industry-related knowledge is likely to increase further.

However, the state government has not to date undertaken a competence mapping or technology roadmap exercise to pinpoint gaps in capabilities or missing links on Johor's emerging value chains.<sup>107</sup> This, consequently, means that at a technical level, state government officials are not able to target priority activities for investment or work to bolster local capabilities to enable more compete value chains.

Furthermore, the way that the state's industrial parks have been developed and marketed is not conducive to the formation of inter-firm linkages. JCorp's remit for the sale of industrial land is uniquely profit-based, and no allowance is made for strategic placing of investment activities with the aim of creating eventual synergies. For example, Pasir Gudang, is billed as a location for manufacturing of medium intensity has oil & gas, steel making, and E&E firms alongside others that make cocoa, edible oils, and snack foods.<sup>108</sup> Investors are served solely on a first-come, first-served basis. In addition, while state government plans have explicitly recommended cross-subsidizing plots for small firms, JCorp's parks do not have land sited for this purpose.<sup>109</sup>

However, the state government does have an SME support unit, which acts as a broker between local entrepreneurs, the federal government, and the member of the state Executive Council responsible for small businesses. Established in 2001, the Johor Corporation for Entrepreneurs (Perbadanan Usahawan Johor Bhd (PUJB)) facilitates applications for grants and loans, and provides technical and marketing support. In particular, it works closely with the federal government agency for small firms, SME Corporation, on its Bumiputera Enterprise Enhancement Programme. However, PUJB does not target the E&E sector or its supporting industries. At present, it works with some 30 firms in rural areas, particularly those involved food processing.<sup>110</sup>

JCorp has also been active in trying to create networks of entrepreneurs. Thus, it established the Johor Business and Industry Club (BISTARI) in 1991 for Bumiputeras to meet and exchange ideas, accompanied by a business centre with information on how to start up businesses. In 2001, this was complemented by the Malaysian Islamic Chamber of Commerce. While these initiatives are promising, neither the Johor state government nor JCorp has established mechanisms for reaching out to the segments of the local manufacturing sector that are not Malay, which is approximately 80% of the total.<sup>111</sup>

Of course, the government is not the only mechanism through which communication between firms can take place. Johor does have chapters of the largest Malaysian business associations such as the Malaysian International Chamber of Commerce and Industry as well as the ethnic Chambers of Commerce. However, with the exception of the Chinese Chamber of Commerce and Industry, their membership does not tend to come from the manufacturing sector. There is a large local branch of the Federation of Malaysian Manufacturers, which has been in Johor since 1968 and currently has some 370 members. It regularly carries out surveys, produces business guides, and is also a training provider recognized by the federal government.<sup>112</sup> However, while these associations do liaise with the federal and state governments at a technical level, they are not involved in planning processes.<sup>113</sup>

The most promising instance of dialogue and cooperation for firms in the manufacturing sector is being carried out by the SME Association of South Johor. Established in 2001, the association has 500 members from the southern part of the state in a range of sectors, including E&E. Its goals are to give SMEs a bigger voice, make linkages between the government and the private sector, and bolster capabilities through providing information. The association holds training sessions in English and Chinese on government grants and loans, marketing techniques, and accounting techniques. In addition, its President is an adviser for the Johor State Government's training institute, the Johor Skills Development Centre.<sup>114</sup>

Incidentally, one very useful mechanism for dialogue between the private sector and the state government has been the annual Malaysia-Singapore business meeting. Chaired by the former head of the Ministry of International Trade and Industry, Rafidah Aziz, it would comprise a number of heads of department and state-level delegations that travelled to Singapore. This gave the opportunity for many Singaporean operators to voice issues regarding public works, human resources, and land management to high-level policy-makers.<sup>115</sup>

For much of the manufacturing sector, there is a feeling that means of communicating and articulating the private sector's issues need to be improved. A background survey for the 2006 Comprehensive Development Plan found that 89% of respondents supported the establishment of and E&E Cluster Association with the aim of articulating issues facing the sector as a whole.<sup>116</sup>

Thus, the Johor state government has pursued a largely state-led approach to planning, with little scope for input from the local business community. It has made attempts to foster the emergence of a Bumiputera core of entrepreneurs, but neither the Johor state government nor JCorp have engaged in dialogue with the non-Malay majority in the manufacturing sector. This bottleneck in communication has led to the emergence of several promising private sector-led organizations, but survey data indicates support for more efforts in this area.

## Addressing market failures:

Over the past three decades, the Johor state government planned and acted on a number of fronts to address perceived market failures. These include: making strategic investments in new sectors; promoting entrepreneurship; addressing skills shortages; and providing collective facilities and knowledge-generating failures.

## Strategic investments

Using JCorp as an institutional vehicle, the Johor state government made a range of investments in new sectors in order to generate profit, encourage diversification, and diminish risk for other investors.

From its initial focus on securing land in the 1970s, JCorp expanded significantly during the 1980s and early 1990s, coming to comprise some 15 divisions by 1997. This spanned primary, secondary and tertiary sectors, with a range of investments in Malaysia and also across the globe. While priorities changed over time and the Corporation underwent a large-scale restructuring post-1997, it had a number of sectors where it made a concerted attempt to attain market leadership.

*Palm Oil* - from its organizational inception, JCorp placed a clear priority on this sector through acquiring plantations both for revenue generation and for conversion into industrial parks. Through a gradual acquisition strategy, the Corporation was able to obtain majority control of Kulim, one of Malaysia's largest palm oil interests, and it purchased plantations in Indonesia, Solomon Islands, and Papua New Guinea (where it is the country's largest employer). With majority stakes in six plantations and minority shares in another five, JCorp is the world's largest producer of palm oil seeds. The Corporation also invested in down-stream industries such as refining and storage, capitalizing on its ownership of Tanjung Langsat Port. Up until its sale of NatOleo in 2010, JCorp was the second largest oleo-chemical producer in Malaysia.<sup>117</sup>

*Food and Quick Service Restaurants* - JCorp owns, through various subsidiaries, a large network of franchises of fast food outlets in the region. These include more than 550 KFC restaurants in Malaysia, Singapore, Brunei, and Cambodia, with planned outlets in India, as well as more than

250 Pizza Hut outlets in Malaysia and Singapore. There are other down-stream activities such as corporate catering, poultry farming, a feed-mill business, and a range of food products.<sup>118</sup>

*Healthcare* - a largely fortuitous incursion into the health-care sector in the 1980s has resulted in the largest network of private hospitals in Malaysia, with 22 in the country, a further two in Indonesia, and a head-count of almost 7,000 staff. Spin-offs from this include a College of Nursing and Health Science, with campuses in Kuala Lumpur and Johor Bahru.<sup>119</sup>

*Property* - JCorp is active in the residential, commercial, and industrial real estate sectors Đ the latter through its subsidiaries, TPM Technopark and Tanjung Langsat Port. Through this stable of companies, JCorp owns: a number of well-placed commercial premises including four hotels, a resort, a number of shopping complexes, and the state's largest convention centre; as well as prime industrial land in all major urban centres in the state.<sup>120</sup>

However, it is noteworthy that none of these initiatives targeted either the E&E sector or any of its downstream activities. This is despite repeated plans to foster excellence in specific areas of the electronics sector, as well as supporting industries such as automation and precision engineering.<sup>121</sup> That said, JCorp did have a number of manufacturing subsidiaries before 1997, they were heavy industry concerns with important steel, aluminium, and tube-making enterprises.<sup>122</sup> Many of them were privatized in the wake of the financial crisis.

#### Enabling Entrepreneurship

In addition to seeking to diversify Johor's economy and generate revenue, a central component of JCorp's organizational remit is to foster a Bumiputera commercial and industrial community. A key strategy for attaining this goal is the 'intrapreneuring' concept, where promising entrepreneurs have a minority stake in a firm and are responsible for day-to-day management. In return, JCorp has a majority stake and supplies the entrepreneur with technical support and capital. JCorp managers are eligible to be intrapreneurs, or those outside may apply for this status in return for selling a majority stake to the Corporation. This strategy is seen to correct a key market failure in that it selects the most able entrepreneurs and does not make the possession of capital a 'precondition' for entrepreneurship.<sup>123</sup>

The largest and most successful intrapreneur operations then come under the Sindora holding company, which is listed on Kuala Lumpur's main board. At present, Sindora has 11 large enterprises, which are active in the following sectors: shipping for the oil and gas sectors; medical device manufacture; timber; bio-fertilisers; edible oil; insurance; a business processing outsourcing firm; and a manager of a chain of parking lots in 6 countries. In addition, many of the Managing Directors of the Corporation's listed companies such as Kulim, KPJ, and KFC were selected through this method.<sup>124</sup>

These initiatives have certainly spawned a number of very successful business enterprises and display formidable institutional capacity at sensing viable commercial opportunities and grooming entrepreneurs. However, none of these initiatives targeted either the E&E sector or any of its downstream activities. In addition, because of the exclusive focus on the Bumiputera community,

the majority of the manufacturing sector was by-passed.

#### **Skills Provision**

The federal government has established two technology universities in the state and there are a number of technical and vocational colleges. Despite this, feedback from industry has persistently signalled the need for skilled workers in greater quantities and with more industry-relevant content.

To this end, both the Johor state government and JCorp have been active in seeking to address the need to further develop the human resource base. The Johor state government has funded the creation of 12 community colleges throughout the state, as well as an Industrial Technology Institute which provides: diplomas in a range of engineering disciplines in conjunction with the Technology University; as well as a number of qualifications of a vocational nature.<sup>125</sup> The links with the local university are promising, however, there is little evidence of industry input into the curriculum or choice of courses.

JCorp has also been active in this area through its subsidiaries. Key institutions in its stable of firms include the Entrepreneurial Development Unit and the Institute of Management Development, both of which are geared to providing a range of technical and managerial courses to Bumiputeras.

Of more direct relevance to the E&E sector, JCorp established its own industry training centre, the Johor Skills Development Centre, in 1993. Inspired by the Penang Skills Development Centre, the Johor equivalent was set up with a grant and premises from JCorp in the Pasir Gudang industrial park. Over the past 18 years, the JSDC has trained some 35,000 workers in a range of industry-relevant courses. At present, the Centre has a turnover of RM 7 million and obtains a considerable amount of funding and equipment from the federal government. Its programs target: current workers who need to upgrade skills; school leavers; and unemployed graduates. While the JSDC does cater to the electronics sector and has worked with firms such as Flextronics and Jabil Circuit, it is more oriented to the heavy industry sector - particularly oil and gas. This can be seen by analyzing its most popular courses, which are welding and machine maintenance.<sup>126</sup> A key difference from its Penang counterpart is while it is owned and managed by JCorp, the Penang Skills Development Centre is managed by a council largely comprised of member firms - ensuring constant input from industry regarding the curriculum.

Thus, both the Johor state government and JCorp has been proactive in trying to ameliorate the crucial skills shortages issue by establishing training centres and colleges for the E&E sector. However, as with the broker policies, these initiatives are state-led, as opposed to benefiting from input by the private sector.

#### Collective Facilities and Knowledge-generating Services

Policy-makers in Johor have been aware of the need to improve the local-level business environment through providing collective facilities for firms and improving their access to industry-relevant knowledge. As it stands, public facilities such as libraries, technology centres, or laboratories are under-provided, and survey responses indicate little interaction with the existing infrastructure for generating knowledge.<sup>127</sup>

Over the years, the drafters of Johor's economic plans have proposed a number of initiatives to address these issues. In particular, the Johor Operational Master Plan proposed an ambitious plan to improve the environment for innovation. This included: an information centre for the manufacturing sector; an industrial park for SMEs with an incubator, publicly-available equipment, an information and referral centre and training facilities; and a high-technology park or 'Technopolis', which would house the most technologically-advanced industrial operations and would be located next to the Technology University.<sup>128</sup>

The first two initiatives were not implemented. However, JCorp did pursue the idea of a Technopolis aggressively, through the establishment of the Johor Technology Park in 1996. Inspired by industrial parks such as the Hsinchu Science City in Taiwan and Sophia Antipolis in France, the Technology Park was meant to attract technology-intensive operations by providing R&D facilities, consultancy services, and a pool of skilled labour. Following in the footsteps of the Technology Park Malaysia and Kulim High-tech Park, which were funded by the federal government, the Johor equivalent was the only such park funded by a state government.

To this end, the Technology Park was located next to the Technology University as well as the airport. Original plans foresaw that the Park would have high-end telecommunications infrastructure routed through Singapore, as well as: two business incubators with an array of supporting services (management, venture capital, patent protection); an R&D centre housing leading public sector bodies such as the Malaysian Institute of Microelectronic Systems and the Standards and Industrial Research Institute of Malaysia (SIRIM) as well as high-end MNC operations; and a business centre. The targeted sectors would be electronics, information technology, and biotechnology.<sup>129</sup>

However, the potential of the Park has been hamstrung by a number of issues. The first was the 1997 financial crisis, which scuttled plans to provide collective facilities for tenants. The second is that planned investments by the federal government have not materialized to the extent anticipated. The planned anchor tenants, particularly MIMOS, have not set up facilities in Johor, and while SIRIM has a facility, it is small and does not generate much demand for supplier services. The third is that efforts on the part of the Technology University to engage with the private sector are still in their infancy.<sup>130</sup>

As a result, the planned exclusive use of the Park for the targeted sectors was abandoned, with the lots in the Park being sold on a first-come, first-served basis. At present, the Technology Park is 90% full. It does have some anchor tenants in the E&E sector, such as Classic Advantage and Seagate. However, the remainder are comprised of firms in the oil & gas and steel fabrication sectors as well as some retailers. Efforts to strengthen ties between tenants in the Park have stopped.<sup>131</sup>

Following the establishment of the Iskandar region, some private sector developers are marketing industrial parks with an integrated approach, targeting specific sectors for investment and complementing this with sector-specific facilities for tenants. Thus, the Senai High Tech Park, like the Johor Technology Park, seeks to leverage its proximity both the airport and the Technology

University. It targets: technology-intensive E&E manufacturing in sectors such as semiconductors, photonics, optoelectronics, and nano-technology, as well as green technology; research and development operations; as well as higher end services such as operational headquarters and regional procurement centres. Upon completion of its first phase at the end of 2011, the Park promises a mix of vacant lots, ready-built factories, incubators for small businesses, as well as a laboratory and facilities for rental.<sup>132</sup> To date, Senai High-Tech Park has received a number of investments for the manufacture of solar cells, and has signed MoUs with the University of Science and University of Technology who will lease land in the Park.<sup>133</sup>

The Johor state government and JCorp were aware of the need to provide the E&E industry with a range of supporting facilities and services, particularly if they wanted to attract more sophisticated activities. Planned initiatives for the manufacturing sector as a whole, as well as for SMEs in particular did not materialize. However, the state government did commission a plan for a technology park that would: tap knowledge generated in the university and large public sector research organizations; provide incubator facilities for small firms; attract high-technology operations in target sectors; and provide a range of publicly-available facilities to boost firm capabilities. However, the financial crisis prevented the plan from being implemented fully. At present, the Technology Park houses a range of industries and synergies between tenants or the University have not materialized.

## Conclusion

Using a Regional Innovation Systems approach, this paper has sought to analyze Johor's electronics sector, and the extent to which meso - or state - level organizations and policies have sought to foster its development.

Regarding the regional production structure, the paper has analyzed data by MISC category and firm size over time. Where possible, comparisons have been made with Penang, which houses the largest and most sophisticated firm grouping in the country.

Thus, Johor houses a substantial number of electronics firms which account for some 20% of employment in the manufacturing sector. However, over the past decade, the sector has contracted substantially, and this has largely been concentrated in the TV/radio receiver subsector. Unlike in the past, when consumer electronics manufacture was the most important subsector, components are now the most important. However, relative to Penang, Johor's electronics sector is smaller, with a greater concentration in the consumer electronics sector.

Analysing by sub-sector, it would appear that many of the operations in Johor are more labourintensive than those in Penang. Regarding the components sub-sector, Johor has very limited activity in the manufacture of semi-conductors or associated niche activities such as design. In addition, the state has a core of contract electronics manufacturers that are essentially feeder plants for operations in Singapore - and to a lesser extent Penang. These firms tend to perform most of their activities in-house, thus generating little demand for ancillary services. In the computer machinery sub-sector, much of the activity seems to be taken up by the relatively unsophisticated manufacture of computer peripherals. And, as mentioned, consumer electronics manufacture also constitutes a significant amount of activity. Comparisons with Penang show that firms in Johor are less networked and have lower levels of technological capability.

Thus, given the framework advanced in the second part of the paper, it is argued that the electronics sector in Johor more closely fits the Satellite Platform model. Thus, the relative abundance of large, self-reliant firms with an external orientation has meant that little has emerged in the way of a local culture or locally-rooted networks. While these Platforms do generate jobs and income, their reliance on price leaves them vulnerable.

Insofar as the regional supportive infrastructure, the efforts of the Johor state government and its subsidiary, JCorp, loom large. Regarding providing an enabling environment for business, the most visible area of state government activity has been in the provision of land and industrial parks. In certain aspects, particularly securing strategically-located land, providing ports, and linking the two main parks together, JCorp has been very proactive. In the case of Pasir Gudang, assuming management functions of the local authority also put the Corporation in a key position to enable effective service delivery - particularly in the early period, when the state's reputation was not yet cemented.

However, in other areas of providing an enabling environment, Johor's record is rather more mixed. Its acceptance of federal policies promoting privatization entailed relinquishing its control over sewerage, solid waste management, and water supply. This is particularly marked with regard to water provision which, following privatization, saw Johor's competitive advantage in this area erode significantly.

The recent involvement by the federal government in the Iskandar Malaysia region probably bodes well for current and future infrastructure investments. This, and potential synergies arising from planned investments in the higher education sector, are probably what will help the E&E in future, rather than any specific initiative.

Regarding brokering activities, in particular value-enhancing dialogue, the state government has invested significant resources in developing plans to understand events as they affected its economy and chart necessary initiatives. However, planning has been exclusively state-led, and has not benefited from firm-level technical information regarding issues. In particular, established business associations have been by-passed. No technology or capability mapping exercises have been conducted, meaning that state government officials do not have the wherewithal to target priority areas for investment. In addition, land in state-owned industrial parks is sold uniquely with commercial criteria in mind, as opposed to seeking to create synergies and foster relationships.

The state government has been proactive with regard to fostering the emergence of a Bumiputera entrepreneurial community, and established a series of initiatives to this effect. However, an exclusive focus on this community meant that the majority of the manufacturing sector was by-

passed. As a result, the necessary base of social capital between the government and local firms has been absent, preventing any collective attempt to foster upgrading. However, there are some initiatives that have arisen organically to try to address the lack of social capital and the 'disconnect' between the local state and private sector.

The state government has been a very important player in the local economy, seeking to address a range of market failures. Using the proceeds from its oil palm plantations, sales of industrial land, and profitable subsidiaries, JCorp was able to expand and make strategic investments in a range of sectors from restaurants to healthcare - attaining market-leading positions in many cases. This was been coupled with a concerted effort to groom the ablest JCorp managers to become entrepreneurs. However, none of these efforts connected with the E&E sector or any of its supporting industries.

Regarding the need to address market failures in the supply of skilled labour as well as capabilityenhancing initiatives such as providing collective facilities, incubators, and information for local firms, the Johor state government was more proactive. In particular, both the state government and JCorp invested considerable resources in establishing specialized facilities for industrial training. As with other initiatives, they are exclusively state-led efforts, which may hamper their effectiveness. The Johor Technology Park represented the state government's most ambitious attempt to encourage the growth of more value-added investment in the state. However, the financial crisis curtailed its full implementation.

Thus, the Johor state government has been an active and proactive agent in the development of its economy. Despite ceding control over important services, it has seriously attempted to provide the necessary infrastructure and service delivery for the manufacturing sector. While it has, in some measure, attempted to provide more specialized infrastructure and human resources, these efforts have been surpassed by those oriented to pursuing other priorities, notably seeking to directly occupy strategic economic sectors and cultivate the emergence of a select group of entrepreneurs.

## Endnotes

<sup>1</sup> Zainal Aznam Yusof and Deepak Bhattasali, "Economic Growth and Development in Malaysia: Policy Making and Leadership" Working Paper 27, Commission on Growth and Development (Washington D.C.: World Bank 2008), p. 11.

<sup>2</sup> According to Weiss, structural transformation is defined as engineering a transition from an economy based on agriculture to one based on industries or services. Upgrading entails: creating new production activities, speeding up technological learning, and disseminating innovative practices within a specific sector. Linda Weiss, *The Myth of the Powerless State: Governing the Economy in a Global Era,* (Cambridge: Polity Press, 1998), p. 66.

<sup>3</sup> K.S. Jomo "Industrialization and Industrial Policy in Malaysia" in *Malaysian Industrial Policy*, edited by K.S. Jomo (Singapore: NUS Press 2007), pp. 30-31; Dieter Ernst "Global Production Networks in East Asia's Electronics Industry and Upgrading Prospects in Malaysia" in *Global production networking and technological change in East Asia*, edited by Shahid Yusuf, M. Anjum Altaf, and Kaoru Nabeshima (Washington D.C.: World Bank 2004), pp. 123-5.

<sup>4</sup> World Bank, *Malaysia, Productivity and Assessment Climate Assessment Update*, Report No. 49137-MY, (Washington D.C..: World Bank 2009), pp. 27-32; Shahid Yusuf and Kaoru Nabeshima, *Tiger Economies under Threat: A Comparative Analysis of Malaysia's Industrial Prospects and Policy Options* (Washington D.C.: World Bank 2009), p. 30-35.

<sup>5</sup> Richard Doner, Brian K. Ritchie, and Dan Slater, "Systemic Vulnerability and the Origins of Development States: Northeast and Southeast Asia in Comparative Perspective", *International Organization* 59 (Spring 2005): 327-361.

<sup>6</sup> Jeffrey Henderson and Richard Phillips "Unintended consequences: social policy, state institutions, and the 'stalling' of the Malaysian industrialization project" *Economy and Society*, volume 36, Number 1, (February 2007): 83; Brian K. Ritchie, "Coalitional Politics, Economic Reform, and Technological Upgrading in Malaysia", *World Development*, 33 no. 5 (2005): 745-61.

<sup>7</sup> Greg Felker with Jomo K.S. "Technology Policy in Malaysia" in *Malaysian Industrial Policy*, edited by K.S. Jomo (Singapore: NUS Press 2007), pp. 132, 147.

<sup>8</sup> Yoon Chon Leong "Penang's Technology Opportunities" in *Catching the Wind: Penang in a Rising Asia* edited by Francis E. Hutchinson and Johan Saravanamuttu (Singapore: Institute of Southeast Asian Studies, forthcoming).

<sup>9</sup> Rajah Rasiah "Systemic Coordination and Human Capital Development: Knowledge Flows in Malaysia's MNC Driven Clusters" INTECH Discussion Paper 2002-07, (Maastricht: INTECH 2002), pp. 31-32.

<sup>10</sup> Johor State Investment Centre Industry Directory, http://www.jsic.com.my/database/ industry/read\_list.php, accessed 15/09/2011.

<sup>11</sup> Michael H. Best and Rajah Rasiah, "Malaysian Electronics: At the Crossroads", Small and Medium Enterprises Branch, Technical Working Paper No 12, (Vienna: UNIDO, 2003), p. 40-47; Rajah Rasiah "Industrial Clustering of Electronics firms in Indonesia and Malaysia" in *Production Networks and Industrial Clusters: Integrating Economies in Southeast Asia*, edited by Ikuo Kuroiwa and Toh Mun Heng (Singapore: IDE/ISEAS, 2008), p. 151.

<sup>12</sup> Ann Segal and Erick Thun, "Thinking Globally, Acting Locally: Local Governments, Industrial Sectors, and Development in China", *Politics and Society*, 29, no. 4 (2001); Elizabeth Remick, "The Significance of Variation in Local States: The Case of Twentieth Century China", *Comparative Politics*, 34 (July 2002); Aseema Sinha, *The Regional Roots of Developmental Politics in India: A Divided Leviathan*, (Bloomington: Indiana University Press, 2005).

<sup>13</sup> Allen J. Scott and Michael Storper, "Regions, Globalization, Development", *Regional Studies*, 37 No. 6-7 (2003), p. 14; Philip Cooke, "Strategies for Regional Innovation Systems: Learning Transfer and Applications". Cardiff: Centre for Advanced Studies, Cardiff University, 2001, p. 30.

<sup>14</sup> Richard F. Doner, *The Politics of Uneven Development: Thailand's Economic Growth in Comparative Perspective* (Cambridge: Cambridge University Press, 2007), p. 16.

<sup>15</sup> Ninth Schedule of the Constitution of Malaysia.

<sup>16</sup> Johore State Economic Development Corporation Enactment 1968, p. 7.

<sup>17</sup> Chet Singh "The PDC as I Know It (1970-90)" in *Malaysia: Policies and Issues In Economic Development.* (Kuala Lumpur: Institute of Strategic and International Studies, 2011); Francis E. Hutchinson "'Developmental" States and Economic Growth at the Sub-national Level: The Case of Penang', *Southeast Asian Affairs 2008,* Institute of Southeast Asian Studies, Singapore, 2008; Rajah Rasiah 'Government-business coordination and the development of Eng Hardware' in *Industrial Technology Development in Malaysia: Industry and Firm Studies,* edited by K.S. Jomo, Felker G., and Rasiah R. (London: Routledge 1999).

<sup>18</sup> Under the 8<sup>th</sup> and 9<sup>th</sup> Malaysia Plans, the federal territories of Kuala Lumpur, Putrajaya, and Labuan received - in per capita terms - four times the average development expenditure allotted to the 13 states.

<sup>19</sup> Michael H. Best "Cluster Dynamics in Malaysian Electronics" in *Malaysian Industrial Policy*, edited by K.S. Jomo (Singapore: NUS Press 2007), p. 267.

<sup>20</sup> Johor Corporation, *Annual Report 2008* (Johor Bahru: Johor Corporation 2009), p. 10.

<sup>21</sup> Established clusters also offer 'thicker' labour markets. Peter Dicken, *Global Shift: Transforming the World Economy*, 4<sup>th</sup> edition, (London: Sage Publications 2003), pp. 22-23.

<sup>22</sup> Hubert Schmitz "Small Shoemakers and Fordist Giants: Tales of a Supercluster", *World Development* vol. 23, no. 1, (1995), p. 10.

<sup>23</sup> Scott, A.J., 1996. 'Regional Motors of the Global Economy', *Futures*, 28(5):391-411; Scott, A.J. and Storper, M., 2003. 'Regions, Globalization, Development', *Regional Studies*, 37(6-7):579-93.

<sup>24</sup> See, for example: OECD. New Forms of Governance for Economic Development.
 Paris: Organization for Economic Cooperation and Development, 2004; European Commission.
 "Constructing Regional Advantage: Principles, Perspectives, Policies" (Brussels: Directorate-General for Research, European Commission, 2006).

<sup>25</sup> Shiro Abe, "Regional Innovation Systems in Japan: the case of Tohoku". In H-J Braczyk, P. Cooke, and M. Heindenreich (eds) *Regional Innovation Systems: The role of governances in a globalized world*. London: Routledge 1998:286-318; for Korea, Sam Ock Park, "Regional Innovation Systems for the Knowledge Economy", *Geojournal* 53:29-39, 2001; and for Malaysia; Francis Hutchinson, 'Shallow Pockets but Close to the Action: Industrial Policy at the Subnational Level Đ the Case of Penang' in Ooi Kee Beng and Goh Ban Lee (eds) *Pilot Studies for a New Penang*, ISEAS, 2010.

<sup>26</sup> Philip Cooke, "Regional Innovation Systems, Clusters, and the Knowledge Economy", *Industrial and Corporate Change*, Vol. 10, No. 4 (2001), p. 953.

<sup>27</sup> Philip Cooke, "Regional Innovation Systems, Clusters, and the Knowledge Economy", *Industrial and Corporate Change*, vol 10, no. 4 (2001), p. 953.

Martin Andersson and Charlie Karlsson, "Regional Innovation Systems in Small and
 Medium-sized Regions: A Critical Review and Assessment", CESIS Working Paper Series, No.
 10 (Stockholm: Centre of Excellence for Science and Innovation Studies, 2004), p. 10.

<sup>29</sup> Philip Cooke, "Strategies for Regional Innovation Systems: Learning Transfer and Applications" (Cardiff: Centre for Advanced Studies, Cardiff University, 2001), p. 30.

<sup>30</sup> Elisa Giuliani and Martin Bell, "Industrial Clusters and the Evolution of their Knowledge Networks: Revisiting a Chilean Case". SPRU Electronic Working Paper Series no. 171 (Brighton: Science Policy Research Unit, University of Sussex, 2008), pp. 21-22.

<sup>31</sup> Helen Shapiro and Lance Taylor. "The State and Industrial Strategy", *World Development*, vol. 18 no. 6 (1990), p. 862.

<sup>32</sup> Christine Oughton, Mikel Landabaso, and Kevin Morgan. "The Regional Innovation
 Paradox: Innovation Policy and Industrial Policy", *Journal of Technology Transfer*, 27 (2002), p.
 97.

<sup>33</sup> Ann Markusen, "Sticky Places in Slippery Space: A Typology of Industrial Districts", *Economic Geography*, Vol 72, Issue 3 (1996): 293-313.

<sup>34</sup> Peter Dicken, *Global Shift: Reshaping the Economic Map in the 21<sup>st</sup> Century*, (London: Sage Publications, 2003), pp. 254-55.

<sup>35</sup> Peter Dicken, *Global Shift: Reshaping the Economic Map in the 21<sup>st</sup> Century*, (London: Sage Publications, 2003), pp. 400.

<sup>36</sup> Markusen also proposes a fourth variant, the so-called 'state-anchored' district, which relies on the activities of one or more state-owned facilities. Given that the majority of activity in the E&E sector is private sector-led, its attributes will not be reviewed in detail here.

<sup>37</sup> The most well-known cases come from the Third Italy, see M. Piore and Charles Sabel, *The second industrial divide: Possibilities for prosperity* (New York: Basic Books, 1984). Other examples include: the IT industries in Silicon Valley and Route 128, and the entertainment industries in Hollywood and New York. See: Annalee Saxenian, *Regional Advantage: Culture and Competition in Silicon Valley and Route 128* (Cambridge: Harvard University Press, 1994); Annalee Saxenian, "Regional Systems of Innovation and the Blurred Firm", in *Local and Regional Systems of Innovation*, edited by John De La Mothe and Gilles Paquet (Boston: Kluwer Academic Publishers, 1998); and Allen J. Scott, *On Hollywood: the Place, the Industry* (Princeton, N.J.: Princeton University Press, 2005).

<sup>38</sup> Trocki, Carl A. *Prince of Pirates: Temenggongs and the Development of Johor and Singapore, 1784-1885.* (Singapore: NUS Press, 2007), pp. 19, 87.

<sup>39</sup> Ministry of Plantation Industries and Commodities, *Statistics on Commodities 2009*, (Putrajaya: Ministry of Plantation Industries and Commodities, 2010).

<sup>40</sup> Johor State Economic Planning Unit, *Economic Report 2008/2009*, (Johor Bahru: State Government of Johor Darul Ta'zim 2009), p. 2-13.

<sup>41</sup> Data provided by the Department of Statistics, Malaysia. This refers to those firms classified under the Malaysian Standard Industrial Classification (2000) codes of 300, 321, 322, and 323.

<sup>42</sup> Johor State Investment Centre Industry Directory, http://www.jsic.com.my/database/ industry/read\_list.php, accessed 13/09/2011. Thus, Muar has STMicroelectronics, the French-Italian semiconductor producer, and Pioneer, who manufactures DVD players. Sharp and Fujitsu have facilities in Batu Pahat, making DVD players in the case of the former and telecommunication components and computer peripherals in the case of the latter. Kota Tinggi in the east of the country houses a large General Electric facility assembling printed circuit boards and thermostats.

<sup>43</sup> Background Industrial Surveys for SJER Development Master Plan Study, RMA Perunding Bersatu 2006. N= 50, based on a random sample. However, it is likely that this sample is skewed towards firms in the larger, state-owned industrial parks.

<sup>44</sup> Company presentation, July 31, 2011.

<sup>45</sup> Some firms active in these areas include U.S. firm Coilcraft and Japanese Epson Precision, the latter managed from the regional headquarters in Singapore (company websites).

<sup>46</sup> http://www.celestica.com/Worldwide/Worldwide.aspx?id=984 , accessed 14/09/2011.

<sup>47</sup> Reuters News, 6 May 2011; http://www.venture.com.sg/contact/worldwide.html, accessed 15/09/2011.

<sup>48</sup> http://www.shima-ele.com/eng/gaiyou.html; http://www.startronics.com.au/aboutus. html, accessed 15/09/2011.

<sup>49</sup> Business Times Malaysia, 16 August 2010, 7 July 2011.

<sup>50</sup> Business Times Malaysia, 11 August 2010.

<sup>51</sup> http://www.seagate.com/ww/v/index.jsp?locale=en-US&name=malaysia-culture&vgnext oid=c1d5856c23a1e010VgnVCM100000dd04090aRCRD, accessed 15/09/2011.

<sup>52</sup> Johor State Investment Centre Industry Directory, http://www.jsic.com.my/database/ industry/read\_list.php, accessed 14/09/2011.

<sup>53</sup> Johor State Investment Centre Industry Directory, http://www.jsic.com.my/database/ industry/read\_list.php, accessed 14/09/2011. Many of these firms also produce goods that would be classified as domestic appliances such as air-conditioners and vacuum cleaners. One flagship firm, Dyson, is carrying out R&D for vacuum cleaners in Johor.

<sup>54</sup> http://www.lcthcorp.com/; http://www.first-engr.com.sg/about.php, both accessed 15/09/2011.

<sup>55</sup> http://www.sdaletech.com/en/our\_vision.php, accessed 15/09/2011.

<sup>56</sup> Interview with President of a small electronics SME association in Singapore, Singapore May 5<sup>th</sup>, 2010.

<sup>57</sup> Business Times, Malaysia 31 December 2010.

<sup>58</sup> Interview, Johor, May 17<sup>th</sup> 2010. However, Toyoplas is currently headquartered in Singapore and plans to list on the Taiwanese stock exchange.

<sup>59</sup> http://www.ataind.com.my/co\_profiles.html, accessed 14/09/2011.

<sup>60</sup> Rajah Rasiah, 'Systemic Coordination and Human Capital Development: Knowledge Flows in Malaysia's MNC-Driven Electronics Clusters', INTECH Discussion Paper Series 2002-7, (Maastricht: the United Nations University, 2002), pp. 44-45.

<sup>61</sup> Ninth Schedule of the Constitution of Malaya.

<sup>62</sup> Tenth Schedule of the Constitution of Malaya. Abdul Rahim Anuar 'Fiscal

Decentralization in Malaysia', Hitotsubashi Journal of Economics 41 (2000), pp. 88-89.

<sup>63</sup> J.M Gullick, *Rulers and Residents: influence and power in the Malay States, 1870-1920,* (Oxford: Oxford University Press, 1992); Zainah Anwar, *Legacy of Honour,* (Kuala Lumpur: Yayasan Mohamed Noah, 2011).

<sup>64</sup> The legal precedent for this is found in the Documents of 1914 [called *Surat Akaun*] attached to the 1914 Johore Treaty, which was signed between the Sultan of Johor and the British Government, stating that preference in employment in the government would be given to Johor Malays.

<sup>65</sup> Interview with former State Secretary of the Johor State Government, Johor Bahru (24/06/2010).

<sup>66</sup> B.H Shafruddin, *The Federal Factor in the Government and Politics of Peninsular Malaysia*, Singapore: Oxford University Press, 1987), p. 138.

<sup>67</sup> Interview with senior UPENJ Official, Nusajaya, 28/05/2010.

<sup>68</sup> Interview with senior JSIC official, Nusajaya, 18/05/2010.

<sup>69</sup> There are others, notably Kumpulan Prasarana Rakyat Johor (KPRJ) and Yayasan Pelajaran Johor. KPRJ is a company wholly-owned by the Johor State Government that is active in the infrastructure sector. YPJ is the state government's educational foundation. It owns a number of agencies that will be discussed later on in this paper.

<sup>70</sup> Johari Mohamed, "The Role of the Johor State Economic Development Corporation (JSEDC) in the Industrial Development of Johor" in *Improving Urban Environment in South East Asia: Managing Industrialisation through Satellite Communities*, edited by Azman Awang, Mahbob Salim, John F. Halldane (Johor: Institute Sultan Iskandar, 1997), p. 34-37.

<sup>71</sup> Johor Corporation, *1996 Annual Report* (Johor Bahru: Johor Corporation 1997), p. 86. Johor Corporation, *1997 Annual Report* (Johor Bahru: Johor Corporation 1998) p. 70.

<sup>72</sup> Johor Corporation, *1998 Annual Report* (Johor Bahru: Johor Corporation 1998), p. 77); interview with Tan Sri Ali Hashim, former CEO of JCorp, Kuala Lumpur, 05/09/2011; The Edge, January 7, 2011.

<sup>73</sup> JCorp, Annual Report 2010 (Johor Bahru: JCorp 2011), p. 5,

<sup>74</sup> Iskandar Regional Development Authority Act, 2007, pp. 10, 12.

<sup>75</sup> Patrick Guinness, On the Margin of Capitalism: People and Development in Mukim Plentong, Johor, Malaysia (Singapore: Oxford University Press, 1992), p. 34.

76 Rajah Rasiah, "Expansion and slowdown in Southeast Asian electronics manufacturing", *Journal of the Asia Pacific Economy*, Vo. 14, no 2, May 2009, p. 124.

<sup>77</sup> L. van Grunsven, M. van de Heijden, and P. Sluys "Foreign Investment and Industrial Structure in Johor, Malaysia: Final Report of Research Findings" (Utrecht: Faculty of Geographical Sciences, Utrecht University, 1995), p. 28.

<sup>78</sup> UPEN Johor, *Pelan Ekonomi Negeri Johor, 1990-2005* (Johor: Kerajaan Negeri Johor Darul Ta'zim, 1989), pp. 124-27.

<sup>79</sup> RMA Perunding Bersatu, *Johor Operational Master Plan Study* (Johor Bahru: State Economic Planning Unit, 1996), p. 3-28.

<sup>80</sup> RMA Perunding Bersatu, *Johor Operational Master Plan Study* (Johor Bahru: State Economic Planning Unit, 1996), p. 6-6.

<sup>81</sup> MIER, *Johor Industrial Master Plan Study* (Kuala Lumpur: Malaysian Institute for Economic Research, 1997).

<sup>82</sup> Actually, this policy framework is limited to southern Johor only. The Johor State Government has commissioned an Economic Development Masterplan for the whole of the state for the period 2010-2020. However, this document has not yet been approved by the State Executive Council. Interview with private economic consultant for the Johor State Government, Kuala Lumpur, 07/09/2011.

<sup>83</sup> Khazanah Nasional, *Comprehensive Development Plan for South Johor Economic Region 2006-2025* (Kuala Lumpur: Khazanah Nasional 2006), pp. 3-7, 4-17.

<sup>84</sup> Interviews with: UPEN senior official, Nusajaya 28/05/2010; JSIC senior official, Nusajaya 18/05/2010.

<sup>85</sup> UPEN Johor, *Pelan Ekonomi Negeri Johor, 1990-2005* (Johor: Kerajaan Negeri Johor Darul Ta'zim, 1989), p 137; MIER, *Johor Industrial Master Plan Study* (Kuala Lumpur: Malaysian Institute for Economic Research, 1997), pp. 49-51; RMA Perunding Bersatu, *Johor Operational Master Plan Study* (Johor Bahru: State Economic Planning Unit, 1996), p. 6-19.

<sup>86</sup> Interview with Tan Sri Ali Hashim, former CEO of JCorp, Kuala Lumpur, 05/09/2011.

<sup>87</sup> Dato Mohd Ali Hashim "The Johor State Economic Development Corporation as a Successful Corporate Organisation and an Islamic Business Institution" paper presented to the Islamic Development Bank, Nomination for the Islamic Development Bank Award in Islamic Economics, March 1993, p. 3.

<sup>88</sup> Patrick Guinness, On the Margin of Capitalism: People and Development in Mukim Plentong, Johor, Malaysia (Singapore: Oxford University Press, 1992).

<sup>89</sup> Interviews with: Tan Sri Ali Hashim, former CEO of JCorp, Kuala Lumpur, 05/09/2011; and senior official of TPM Technopark, the subsidiary of JCorp charted with the sale of industrial property, Johor Bahru, 08/09/2011.

<sup>90</sup> Interview with a senior official of TPM Technopark, Johor Bahru, 23/06/2010.

<sup>91</sup> Interview with a senior official of TPM Technopark, Johor Bahru, 23/06/2010.

<sup>92</sup> Interview with a business association representative, Johor Bahru, 21/05/2010)

<sup>93</sup> MIDA "Cost of Doing Business in Malaysia" (Kuala Lumpur: Malaysian Industrial Development Authority, 2009); RMA Perunding Bersatu, *Johor Operational Master Plan Study* (Johor Bahru: State Economic Planning Unit, 1996), p. 6-19; Interview with UPEN official, Nusajaya, 28/05/2010.

<sup>94</sup> Charles Santiago "Public-Private Partnership: An Alternative Strategy in Water
Management in Malaysia" in *Reclaiming Public Water* (Amsterdam: Transnational Institute, 2005).

<sup>95</sup> MIDA 'Malaysia: Costs of Doing Business' (Kuala Lumpur: Malaysian Industrial Development Authority, 2009), p. 13.

<sup>96</sup> New Straits Times, March 12, 2009.

<sup>97</sup> Iskandar Malaysia, Flagship D: Important Facts and Details on Eastern Gate Development (Johor Bahru: Iskandar Malaysia, 2008); Iskandar Malaysia, Flagship E: Important Facts and Details on Senai-Skudai (Johor Bahru: Iskandar Malaysia, 2008).

<sup>98</sup> Khor Yu Leng, "Iskandar Malaysia: Policy, Progress, and Bottlenecks", Malaysia Update: September 20011, (Singapore: RSIS, Nanyang Technological University, 2011), p. 23.

<sup>99</sup> Datasheet 'Total Proposed Investments 1990-March, 2010", supplied by the Malaysian Industrial Development Authority.

<sup>100</sup> New Straits Times, 24 January 2011.

<sup>101</sup> Interview with a business association representative, Johor Bahru, 21/05/2010.

<sup>102</sup> Interview with Parti Islam Se-Malaysia official, Johor Bahru, 29/05/2010; Denis Hew "The Malaysian Economy: Developments and Challenges" in *Southeast Asian Affairs 2008*  edited by Daljit Singh and Tin Maung Maung Than (Singapore: Institute of Southeast Asian Studies, 2008), p. 219.

<sup>103</sup> The two principal consultants are the Malaysian Institute of Economic Research and RMA Perunding Bersatu Sdn Bhd Đ both in Kuala Lumpur. The exception is the 2006 Comprehensive Development Plan for South Johor, which was carried out by Khazanah, which is the investment arm of the federal government.

<sup>104</sup> In particular, the Institut Sultan Iskandar, which is a research and consultancy firm with expertise in urban planning, development, and management, was not involved. In contrast, the Penang state government has had historic links with the state's main public university through the Centre for Policy Studies, and academics from the university were involved in its three state-level planning exercises in 1991, 2001, and 2011.

<sup>105</sup> However, the federal government did establish the Malaysian Industry-Government Group on High Technology (MIGHT), as well as the Malaysian Business council. However, the utility of these bodies has been hamstrung by their lack of real ties to the business sector, consisting of hand-picked businesspeople. See Greg Felker, "Malaysia's Innovation System: Actors, Interests, and Governance" in K.S. Jomo and G. Felker (eds), *Technology, Competitiveness and the State*, (London: Routledge 1999).

<sup>106</sup> Johor Investment Digest, and http://www.jsic.com.my/database/industry/read\_list.php.

<sup>107</sup> In contrast, no less than four technical exercises of this nature have been carried out for Penang in: 2001 by JICA; 2003 by Frost and Sullivan; 2007 by the Penang Skills Development Centre; and one currently being undertaken by the Penang-based consulting firm Bizwise Consulting.

<sup>108</sup> TPM Technopark maps of Pasir Gudang, Zone 12a and 12b.

<sup>109</sup> Interview with senior official of TPM Technopark, Johor, 09/09/2011. RMA Perunding Bersatu, *Johor Operational Master Plan Study* (Johor Bahru: State Economic Planning Unit, 1996), p. 6-31.

<sup>110</sup> Interview with senior PUJB manager, Larkin, 27/07/2010.

<sup>111</sup> Background Industrial Surveys for SJER Development Master Plan Study, RMA Perunding Bersatu 2006.

<sup>112</sup> Interview with FMM SME Working Group, Johor, 22/04/2010.

<sup>113</sup> Penang, in contrast, has a more developed set of social relations between firms and the state government. One business association, FREPENCA, has been active in the state since 1978. Comprising some 60 multinationals and large local firms who collectively employ some 60,000 people, this association has been a crucial intermediary working with the state government on issues such as security and infrastructure. FREPENCA has also lobbied the state government periodically on issues such as investment in infrastructure and the availability of human resources. This is complemented by a number of consortias of firms in the photonics, automation, and software sectors. There are also a number of local consultancy outfits such as DCT and SERI, the state government think tank, that carry out periodic firm surveys. The Penang Skills Development centre also provides a regular means of industry to comment on issues, as it has some 150 'member firms' that provide input for course curricula. And, the state government convened a series of committees with the 'captains' of industry, such as the Penang Economic Council (1991-93), Penang Industrial Council (1993-99), and Penang Competitiveness Committee (2002). That said, most of these initiatives favour larger firms, and the state government has been criticized for neglecting the needs of small firms. Francis Hutchinson "Shallow Pockets but Close to the Action: Industrial Policy at the Sub-national Level" in *Pilot Studies for a New Penang*, edited by Ooi Kee Beng and Goh Ban Lee (Singapore: Institute of Southeast Asian Studies, 2010).

<sup>114</sup> Interview with SMEASJ President, Pasir Gudang, 21/04/2010. Another interesting business association is the South Johor Foundry and Engineering Industries Association, which has some 400 members, many of whom are in supporting industries in the manufacturing sector. Interviews with SJFEIA members, Skudai, 23/06/2010.

<sup>115</sup> Interviews with industry observers, Johor Bahru, 25/05/2010, 26/06/2010.

<sup>116</sup> Background Industrial Surveys for SJER Development Master Plan Study, RMA Perunding Bersatu 2006.

<sup>117</sup> This included NatOleo, one of Malaysia's largest oleochemical firms, which was sold in 2010.

<sup>118</sup> JCorp, 2008 Annual Report (Johor Bahru: Johor Corporation, 2009) pp. 80-82; JCorp, 2009 Annual Report (Johor Bahru: Johor Corporation, 2010) p. 82.

<sup>119</sup> Interview with Tan Sri Ali Hashim, former CEO of JCorp, Kuala Lumpur, 05/09/2011; JCorp, *2008 Annual Report* (Johor Bahru: Johor Corporation, 2009), p. 67.

<sup>120</sup> JCorp, 2009 Annual Report (Johor Bahru: Johor Corporation, 2010) pp. 100-103.

<sup>121</sup> RMA Perunding Bersatu, *Johor Operational Master Plan Study* (Johor Bahru: State Economic Planning Unit, 1996), p. 6-19.

<sup>122</sup> Johor Corporation, 1996 Annual Report (Johor Bahru: Johor Corporation, 1997) p. 130.

<sup>123</sup> Dato Mohd Ali Hashim "The Johor State Economic Development Corporation as a Successful Corporate Organisation and an Islamic Business Institution" paper presented to the Islamic Development Bank, Nomination for the Islamic Development Bank Award in Islamic Economics, March 1993, p. 25.

<sup>124</sup> JCorp, 2008 Annual Report (Johor Bahru: Johor Corporation, 2009) p. 87.

<sup>125</sup> http://itpypj.edu.my/v3/bm/kursus, accessed 29/09/2011.

<sup>126</sup> Interview with Johor Skills Development Centre official, Pasir Gudang, 28/04/2010.

<sup>127</sup> 88% of firms do not undertake contract R&D, 96% have not participated in government assistance for R&D. Background Industrial Surveys for SJER Development Master Plan Study, RMA Perunding Bersatu 2006.

<sup>128</sup> RMA Perunding Bersatu, "Pre-feasibility Study for an SMI Industrial Park" (Johor Bahru: State Economic Planning Unit, 1994), p. 2-3; RMA Perunding Bersatu, "Pre-feasibility Study Johor Technopolis" (Johor Bahru: State Economic Planning Unit, 1994).

<sup>129</sup> RMA Perunding Bersatu, "Pre-feasibility Study Johor Technopolis" (Johor Bahru: State Economic Planning Unit, 1994), pp. 4.3-4.5,

<sup>130</sup> Interview with a senior TPM Technopark official, Johor Bahru 09/09/2011.

<sup>131</sup> Interview with a Johor Technology Park tenant, Senai, 28/06/2010.

<sup>132</sup> http://www.senaipark.com/target\_ind.html, accessed 28/09/2011.

<sup>133</sup> The Sun Daily, 23/08/2011; the New Straits Times, 22/05/2010.