20 Years On: The Electronics Sector in the SiJoRi “Growth Triangle”

By Leo van Grunsven* and Francis E. Hutchinson**

EXECUTIVE SUMMARY

In the early 1990s, Singapore, the Malaysian state of Johor, and the Indonesian island of Batam sought to leverage their proximity, differing comparative advantages, and good logistics connections to market themselves as an integrated unit. Despite the initial enthusiasm surrounding the so-called SiJORi Growth Triangle, there is little recent research on how and whether these territories continue to be linked economically. Focussing on the electronics sector, this paper looks at the two ‘non-core’ regions of Johor and Batam to see how they are faring and where their investment come from.

Salient findings include:

• Following an initial period of parallel growth, Batam and Johor are on very different trajectories – negative in the former and positive in the latter.

• While Batam is clearly losing ground to Johor for investment from firms based in Singapore, both locations have been hit by a decline in investment from Japan. In Johor’s case, this has been compensated for by more
Singaporean firms setting up operations. In Batam, this has not been the case.

• Batam’s decline appears to be linked to periods of labour unrest and bureaucratic dysfunctions that have accompanied Indonesia’s decentralization reforms.

• In Johor’s case, the increase in Singaporean investment pre-dates the launch of the Iskandar Malaysia region and appears to be occurring spontaneously.

• While the outlook for Johor is relatively positive, investment from Singapore tends to be in lower-tech products than had been the case with earlier Japanese operations, indicating a potential decrease in complexity and value-added.
INTRODUCTION

Launched in 1989 and originally encompassing Singapore, the Malaysian state of Johor, and the Indonesian island of Batam, the concept of the SIJORI Growth Triangle was used to market the three territories as a “single investment destination” offering: close proximity; well-developed infrastructure and logistical connections; different cost structures; and a significant degree of political capital.

This economic logic, enabled by liberalized investment frameworks, infrastructure investments, and government support led to major investment flows during the 1990s. Of note was the electrical and electronics (E&E) industry which, buoyed by huge Japanese investment, expanded significantly during this period.

Premised on leveraging each territory’s comparative advantage, a “division of labour” emerged, with Singapore as the “core” of the region due to its financial, technological, and managerial resources. For their part, Johor and Batam occupied the “non-core” land, labour, and resource-intensive spaces. Research carried out in the 1990s confirms the heightened production linkages as well as the core/non-core division of labour linking the three territories (Smith 1997; Grundy-Warr et al 1999).

Despite an initial period of high visibility, the Growth Triangle lost momentum over time as the governments of Malaysia and Indonesia began to include more states and provinces in this initiative, thus diluting its economic rationale. Furthermore, diplomatic relations between all three nations went into flux in the late 1990s in the wake of the Asian Financial Crisis. Since then, investment authorities in the three territories have no doubt continued to promote the advantages of proximity and cost differentials, albeit in a less concerted fashion. In tandem with the Growth Triangle’s visibility, research on how the E&E industry connects the three regions has dwindled.

Research on the electronics industry in Singapore indicates that important developments have taken place in the city-state, some of which have important implications for Johor and Batam. According to Toh (2014), the E&E industry has “moved up” the value chain and “moved out” more land- and labour-intensive tasks during the 2000s. Major developments in the industry include:

- Growth in absolute terms, measured by output and value-added.
- Substantial contraction of employment, indicating that operations have become more technology-, capital- and skills-intensive.
- Changed and narrowed focus, with an increase in the production of high-technology, high-precision, and high-value components such as semiconductors/integrated circuits and data-storage products, and a notable decrease in low value-added sectors such as consumer electronics.
In contrast, there is very little known about how the industry has developed in Johor and Batam in recent years, and whether the trends seen in Singapore have had an impact on these locations.

Using data from relevant authorities in Malaysia and Indonesia regarding dates of establishment and closure as well as the nationality of large electronics firms investing in Batam and Johor, this Perspective sheds light on the evolution of the electronics industry in the two locations. Furthermore, it seeks to understand how and whether firms in these two locations have been affected by economic and industrial developments in Singapore.¹

RECENT EVOLUTION OF THE ELECTRONICS SECTOR IN BATAM AND JOHOR

Batam and Johor share a number of important similarities. They are both close to Singapore, a potential source of investment and technology given the city-state’s status as a regional hub for the E&E industry as well as the home-base of many electronics firms. Relative to the city-state, Batam and Johor offer substantially cheaper land and labour, and they are constituent parts of countries that have embraced export-oriented industrialization. Furthermore, the two territories embraced the electronics sector as a pillar of growth at about the same time. However, a comparison of the trajectory of the E&E industry in the two locations shows — following an initially positive trend in both locations – sharply different trajectories over the past decade.

Turning first to Batam, our analysis of data on firm entries and exits shows an initial “boom” period lasting thirteen years (Figure One). In 1990-2003, the number of E&E companies increased consistently from four to a peak of 134. This trend was robust, continuing upward through the Asian Financial Crisis and the 2000-01 electronics downturn. However, after 2003, this trend reversed. By 2004, the number of E&E subsidiaries had dropped substantially to under 90 firms. Over the next six years, the number of firms experienced a modest increase to reach 110 in 2009, but dropped by almost 50 percent in 2010 to slightly above 60, where it stayed steady until 2012. Thus, in this year, there were only 62 electronics MNCs in operation on the island, less than half the number eight years before.

¹ This is the topic of a multi-year research project carried out by ISEAS in conjunction with the Department of Economic Geography of the University of Utrecht. Please see van Grunsven and Hutchinson 2014 for more details.
Looking to Johor, the E&E industry shows a different and more positive trend. In 1993, there were 100 subsidiaries in operation in Johor – more than double the corresponding figure in Batam. Following an increase to around 150 firms in 1995, the number remained fairly flat until 1999. However, in 2000 the number increased substantially to almost 240, before dropping to some 210 firms the following year – most likely due to the 2000-01 global electronics downturn. Since 2001, the number of firms climbed steadily until 2011, when it reached 282. In 2012, the population of E&E firms experienced a slight downturn, falling to 274 firms. In comparative terms, by 2012, Johor’s base of electronics companies was more than four times the size of Batam’s.

What can be said about trends in the arrival and departure of firms, as well as the overall attrition rate? With regard to Batam, a total of 175 electronics firms arrived on the island at some point during the 1990-2012 period. In 2012, only 62 were in operation – indicating a survival rate of 35 percent. In terms of overall trends, the 1990-2003 period was characterized by a sustained level of firm entries and relatively few firm exits. There were slight increases in firm arrivals in 1996 and 1999-2000, and slightly more departures in 1997 and 2000. It is possible that the peaks were part of the overall trend in investment into Batam, and the downturns were linked to the fallout from the Asian Financial Crisis and then the 2001 global slow-down. In aggregate terms, the number of arrivals exceeded the number of departures up until 2003,
thus allowing for the industry's growth in Batam. After 2003, this dynamic changed, with firm exits outnumbering firm arrivals. However, rather than the number of firm exits being evenly distributed across the next ten years, they are concentrated in two years – 2004 and 2010 – when 45 and 48 firms left, respectively (Figure Two).

**Figure 2: Firm Entries and Exits in Batam (1990-2012)**

![Graph showing firm entries and exits in Batam (1990-2012)](image)

*Source: own data*

Looking to Johor, 409 establishments had a presence in the state during the 1995-2012 period and, of these, 274 were still in operation in 2012. While there is also a significant level of entry and exit, Johor has a retention rate of 67 percent - almost double Batam’s. Unlike Batam, the number of arrivals has remained slightly higher than exits, resulting in a steady increase in the number of firms over time (Figure Three). There was, however, one notable jump in 2000, when 78 firms established operations. This was nullified somewhat by 39 firms closing down the following year – most likely due to the 2001 slow-down. For the remainder of the period, the number of exits remained smaller than the number of entries, with the exception of 2012, when 27 firms left and only 15 arrived. Thus, unlike Batam, who has experienced increasing attrition since 2003, the electronics industry in Johor has grown steadily.

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2 Due to data limitations, the arrival and exit of firms can only be traced back to 1995 in Johor. This lowers the length of the average tenure of firms in the state.
What can be said about the nationality of firms, their average tenure, and patterns in their arrival and exit from these locations?

Table One sets out the average tenure, total number, and survival rate of the six most important investor countries in Batam. Singapore and Japan are the source countries for the largest number of firms, each accounting for 47 firms and between them more than half of all E&E firms. This pattern stands to reason. First, Japanese investment has been an important driver of the electronics sector in the region; and due to its proximity, resource constraints, and government support for the development of Batam, Singapore was also an early investor in the island. Other important source countries are: the United States and Malaysia, both with more than ten firms; and Indonesia and Germany, each with six. As with Japan, the United States and Germany are important players in the E&E sector, with important “flagship” firms investing in key electronics hubs. The participation of Malaysian firms is interesting and an indicator of the three-way investment inherent in the Growth Triangle concept. For its part, the presence, albeit small, of Indonesian firms is encouraging, indicating potential technology transfer.
**Table 1: Breakdown of Batam's Tenants by Nationality, Tenure, and Survival (Top Six Nationalities)**

<table>
<thead>
<tr>
<th>Nationality</th>
<th>Average Tenure (in years)</th>
<th>Total Number</th>
<th>In operation today (number)</th>
<th>In operation today (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Singapore</td>
<td>9.7</td>
<td>47</td>
<td>22</td>
<td>46.8</td>
</tr>
<tr>
<td>Japanese</td>
<td>11.7</td>
<td>47</td>
<td>23</td>
<td>48.9</td>
</tr>
<tr>
<td>USA</td>
<td>10.1</td>
<td>15</td>
<td>8</td>
<td>53.3</td>
</tr>
<tr>
<td>Malaysia</td>
<td>6.3</td>
<td>11</td>
<td>2</td>
<td>18.2</td>
</tr>
<tr>
<td>Indonesia</td>
<td>10</td>
<td>6</td>
<td>6</td>
<td>100</td>
</tr>
<tr>
<td>Germany</td>
<td>13.7</td>
<td>6</td>
<td>5</td>
<td>83.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>10.0</td>
<td><strong>175</strong></td>
<td><strong>62</strong></td>
<td><strong>35.4</strong></td>
</tr>
</tbody>
</table>

Source: own data, firms w/ no recorded nationality/ownership (11)

With regard to tenure, German firms stayed in Batam the longest, followed by Japanese firms, with an average stay of 14 and 12 years, respectively. Firms from the United States, Indonesia, and Singapore all stayed an average of ten years. For their part, Malaysian firms stayed the shortest time, with an average tenure of six years.

With regard to their survival rate, approximately half of all firms from the United States, Japan, and Singapore who established operations in Batam were still in operation in 2012. In contrast, while fewer firms from Indonesia and Germany set up operations, those that did were much more likely to survive. Malaysian firms had the lowest survival rate of all, with only two out of eleven firms functioning in 2012. This is probably indicative of Malaysian presence in the more low-tech and competitive tier of the industry. Thus, while the Growth Triangle concept was accompanied by some Malaysian investment into Batam, this occurred early and did not last long.

An analysis of the same indicators in Johor yields some important similarities, but also substantial differences from developments in Batam (Table Two). As with Batam, Japanese and Singaporean firms between them account for just over half of all electronics companies. In this case, though, Japanese firms are the biggest cohort, with 129 firms accounting for almost one-third of the total. For its part, Singapore was the home country of 97 firms, accounting for almost one-fourth of all firms. As in Batam, the United States and Malaysia are also important sources of investment. And, while there is German investment (five firms), it is surpassed by investment from Taiwan and the United Kingdom. Significantly for the Growth Triangle concept, there was very little investment from Indonesia (one firm that lasted one year).
Table 2: Breakdown of Johor’s Tenants by Nationality, Tenure, and Survival (Top Six Nationalities)

<table>
<thead>
<tr>
<th>Nationality</th>
<th>Average Tenure (in years)</th>
<th>Number</th>
<th>In Operation Today</th>
<th>In Operation Today (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>12.4</td>
<td>129</td>
<td>89</td>
<td>68.9</td>
</tr>
<tr>
<td>Singapore</td>
<td>9.3</td>
<td>97</td>
<td>74</td>
<td>77.8</td>
</tr>
<tr>
<td>USA</td>
<td>8.8</td>
<td>34</td>
<td>22</td>
<td>64.7</td>
</tr>
<tr>
<td>Malaysia</td>
<td>6.0</td>
<td>22</td>
<td>6</td>
<td>27.2</td>
</tr>
<tr>
<td>Taiwan</td>
<td>6.7</td>
<td>12</td>
<td>8</td>
<td>66.6</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>6</td>
<td>10</td>
<td>6</td>
<td>60.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>9.7</strong></td>
<td><strong>409</strong></td>
<td><strong>274</strong></td>
<td><strong>66.9</strong></td>
</tr>
</tbody>
</table>

Source: own data, firms w/ no recorded nationality (46). Given data limitations, tenure is taken as starting in 1995.

The average tenure of E&E firms in Johor was 9.7 years. Japanese firms had the longest average tenure of some 12 years, followed by firms from Singapore and the United States, with approximately nine years. Firms from Taiwan, the United Kingdom and Malaysia stayed an average of six years. Relative to Batam, the survival rate of firms of all nationalities is much higher. Firms from Singapore have the highest survival rate, with more than three quarters of firms in operation today. Firms from Japan, the United States, Taiwan, and the United Kingdom had survival rates of between 60-70 percent. Firms from Malaysia had the highest attrition rate, with only slightly more than one quarter surviving. As seen in Batam, this attrition rate is perhaps indicative of an overall lower and more precarious position of Malaysian firms in electronics value chains.

Given their participation in electronics global production networks and their importance for both regions, it is worth comparing patterns of entry into and exit from Johor and Batam of Japanese and Singaporean firms to see if there is any difference in their behaviour.

With regard to Batam, Singaporean and Japanese firms show quite similar behaviour – namely, early entry into the island, with relatively few recent arrivals. The bulk of firm establishment took place in the 1990-1997 and 1998-2003 periods, with very few arrivals after 2004. More than half of Japanese firms arrived in the early 1990s, with some 30 percent arriving in the second period and 10 percent in the final period.
The Singaporean firms, for their part, are evenly divided between the two periods, with 45 percent of firms arriving in 1990-1997 and 1998-2003, respectively. As with the Japanese firms, only 10 percent arrived after 2004.

\textit{Figure 4: Firm Entries into Batam}

\begin{figure}
\centering
\includegraphics[width=\textwidth]{batam_firms.png}
\caption*{Source: own data}
\end{figure}

In Johor, however, the behaviour of Japanese and Singaporean investors is quite different. More than 70 percent of all Japanese firms established operations in the state before 1997. Some 20 percent arrived in the 1998-2003, and less than 10 percent arrived after 2004. This pattern is similar to what we see in Batam, but is more accentuated. This could be reflective of the broad shift in Japanese global production networks away from Southeast Asia to China in the early 2000s.

In contrast, Singaporean firms arrived later in the Malaysian state. Only 30 percent of firms had arrived before 1997. Unlike the Japanese, who had begun to disengage in the second period, more than forty percent of Singaporean firms arrived in the 1998-2003 period. While this proportion fell to 25 percent in the post-2004 period, it is still substantially higher than the proportion of Japanese firms in Johor or Singaporean firms in Batam.
With regard to firm exits from Batam, the pattern shown by Japanese and Singaporean firms is very similar. In both cases, under 10 percent of exits occurred in the first period, and less than 20 percent of exits took place in the second period. For firms of both nationalities, more than three quarters of firm exits took place after 2004 (Figure Six).

Source: own data
With regard to Johor, the pattern of firm exits is very different from what is witnessed in Batam (Figure Seven). Rather than being concentrated in the final period, the distribution of exits is more even, with a majority taking place during the 1998-2003 period. Both Singaporean and Japanese firms had relatively low levels of exit between 1990-97 — with about one quarter of the total taking place in this period. For Singaporean firms, more than half of all departures took place in the 2004-2012 period, due perhaps to fall-out from the Asian Financial Crisis and the 2000-01 slump in the electronics industry. For Japanese firms, this was also a period of attrition, with 39 percent of exits occurring here. After 2004, Singaporean firms experienced the lowest level of attrition, with under 20 percent of exits. Japanese firms, for their part, had more than 35 percent of their exits occurring in this period. This is roughly the level experienced in 1998-2003 and is probably indicative of a broader disengagement from Johor after the Asian Financial Crisis.

**Figure 7: Firm Exits from Johor**

In sum, Japanese firms in Batam and Johor display similar patterns of entry and exit. They were “pioneer” investors in both locations, arriving early and staying long periods of time. However, in both locations their presence had tended to decrease, particularly after 2004. This phenomenon is particularly marked for Batam, where exit levels have been very, very high of late. In contrast, Singaporean firms display different behaviour in the two locations. In Batam, Singaporean investment has largely
followed the Japanese pattern of early entry and sustained exit post-2004. However, in Johor, firm entries are more spread out, with higher levels in 1998-2003 and substantial levels post-2004. With regard to exits, we see a fair number of departures in the first period and a far higher proportion in 1998-2003. In contrast, firm exits in the 2004 are very low. This means that despite the larger number of Japanese firms that have invested in Johor, much of the recent investment has been driven by Singapore, with an important number of firms arriving from the city-state — and relatively few leaving.

IMPLICATIONS FOR BATAM AND JOHOR

The trends set out above indicate that insofar as the E&E sector is concerned, Batam and Johor are on very different trajectories. Batam is clearly in decline, and has been for the past decade. There are very low numbers of firm entries, and the complex has experienced two deep and wrenching episodes of attrition. A corollary of lower levels of firm entry is that the bulk of firms are long-time residents and there are few new activities or promising sub-sectors that could signal growth in different areas of the E&E industry. Research by van Grunsven and Hutchinson (2014) reveals that there is no indication that substantive new areas have emerged.

In contrast, Johor has experienced consistent growth in firm numbers for much of the past two decades. While the complex is not growing as fast as it used to, past developments are quite positive. With the exception of 2012, firm arrivals have been consistently higher than exits for the past decade. Relative to the initial configuration of the industry, there is some new activity in certain downstream sectors of the industry such as sub-assembly and other supporting activities (van Grunsven and Hutchinson, 2014). However, while new to Johor, this is not a necessarily positive development, as it could indicate a transition to lower value-added activities.

Comparing recent developments in Batam and Johor, it is hard not to think that the negative events in the first location are the product of local factors. While the E&E industry in Batam and Johor moved roughly in tandem from the mid-1990s to 2003, the high numbers of firm departures from Batam in 2004 and 2010 are not mirrored in Johor. This difference is all the more salient given the predominance of Japanese and Singaporean firms in both locations and their sharply different patterns of investment in each. This discounts global dynamics in the electronics industry as a cause.

Looking a little closer at Batam, the high numbers of firm departures in 2004 and 2010 coincide with episodes of labour unrest on the island. This in turn is linked to Indonesia’s far-reaching decentralization reforms, which were implemented in 2001. As part of this process — which saw an unprecedented range of responsibilities and civil servants transferred from the national to the sub-national level — the task of establishing minimum wages was delegated to the provincial level, with input from local...
governments. In addition, the minimum wage is calibrated on an annual basis with input from employers and labour. This has given rise to periodic demonstrations by unions.

In 2003, employees from 20 multinational firms in Batam staged demonstrations demanding higher wages. Such demonstrations, occasional factory take-overs, and the associated yearly hikes in the minimum wage have been frequently cited as reasons for factory closures in both Batam and Bintan (The Jakarta Post, 5 March 2007). In April 2010, Batam was paralyzed by riots in a shipyard. While the reasons for the outbreak were localized to one firm, the level of violence was unexpected, with some 5,000 local workers rioting and attacking a group of foreign workers (The Straits Times, 24 April 2010). This episode, coupled with the periodic unrest associated with wage negotiations, have hurt investor sentiment further. According to Kadin, the Indonesian business association, more than USD 10 million was lost in 2011 due to worker slow-downs and demonstrations (The Riau Bulletin, 15 November 2012).

In 2004, the Riau Islands established their own provincial government, splitting off from Riau province. Above and beyond the logistical and resources involved in establishing a new government and provincial capital, there have been a series of bureaucratic overlaps. The Batam municipal government has a number of tributary and land zoning competencies that are in dispute with the provincial government. Despite repeated attempts to clearly demarcate responsibilities between the municipal and provincial government, confusion and overlaps have remained, giving rise to complaints from investors (Choi 2011).

In Johor, recent policy initiatives seem to offer more promise. In 2006, the national and state governments established Iskandar Malaysia (IM) a 2,200 square kilometre swathe in the southern part of Johor. Inspired by Shenzhen-Hong Kong, IM explicitly seeks to capitalize on the state’s lower land and labour costs relative to Singapore. Guided by the Comprehensive Development Plan, which spans 2006-2025, the Plan divides IM into five zones, each with target sectors, lead property developers and planned infrastructure and amenities. However, Iskandar Malaysia does not provide much in the way of specific incentives for manufacturing (Khor 2011). In reality, most of the incentives and zoning favour services such as education, health, and creative/ICT are new to the local economy. Interviews with government officials indicate a certain jadedness with regard to the prospects of the E&E sector. That said, the sector as a whole is likely to benefit from the additional investment in infrastructure as well as a long-term vision and detailed planning for the state as a whole.

It is also important to note that the E&E sector has been growing consistently in Johor since well before 2006, thus making it unlikely that IM is the sole or even most important “driver” of investment in recent times. In all likelihood, the good working relationship between Singapore and Malaysia under Abdullah Badawi and then Najib

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3 Interview with senior Johor Government state official, Nusajaya, 18 May 2010
Razak (Liow 2013) has provided the stability needed for electronics firms to invest across the border.

A word of caution, though, is needed. While new firms have been establishing operations in Johor, and the Malaysian state seems to have beaten Batam in the battle for investment from Singapore, much of this new investment is most likely in the form of smaller Singaporean operations active in some of the industry’s lower value-added niches. These firms are likely to be smaller and more vulnerable to market downswings than the larger, more technologically intensive Japanese firms that used to be present in the region and that have left both Batam and Johor.

While the Growth Triangle never really depended on investment flows between Singapore, Johor, and Batam, it is possible that the “triangular” relationship will be effectively replaced by a Singapore-Johor bilateral relationship of considerable depth and complexity, complemented by a small detachment of committed firms retaining production in Batam.
REFERENCES


