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**Submitted to:
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**Creating Competitive Advantages in the Global Marketplace:
The Singapore `Experiment' in India¹**

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ABSTRACT

Infrastructure can be unreliable and administration subject to corruption in Asia's rapidly emerging economies. This context presented Singapore with unique opportunities to export its 'positive reputation' to locations where these attributes are less certain, through the provision of superior infrastructure, the ability to negotiate investment concessions and, where existing, through the links to influential business groups in the investment location. This strategic initiative is premised on the perception that Singapore's good relations with multinationals, as well as "connections" with Asian business networks, will give the industrial-township projects a marketing advantage. To complement the extensive literature on Singapore's flagship projects in Indonesia and China, this paper takes a closer look at Singapore's lesser-known project in *India*. Case studies of selected companies are also presented. It finds that progress in this privileged foreign investment zone remains stymied by particular dependencies and challenges.

Key words: Industrial Parks - Singapore - India

INTRODUCTION

Although Singapore is faced with resource constraints, she has managed to succeed economically by concentrating on her core-competencies. People-powered, Singapore has thrived herself upon the brand name of infrastructural and technological know-how as well as valuable reputation among foreign companies. Constant economic reform programs have also helped to attract foreign direct investment into the city-state. . Such a move started as early as the mid-1960s which saw the beginnings of the Singapore government's aggressive approach to woo foreign MNCs to fuel the city-state's economic development (Chia, 1986; Pang, 1987). Although much of Singapore's initial growth relied upon such inflow of foreign investment, a reversal of trend was being observed in the mid 1980s. With the rise in economic growth and liberalization of foreign investment controls in the Asian region, Singapore seized the foreign investment opportunities to develop its external economy, locally known as the 'second wing'. This second wing granted Singapore great location-specific resource benefits that were denied in the limited city-state. By leveraging on such advantageous economic resources of neighbouring countries, Singapore was able to counter its own resource-deficient status.

The regionalization program saw the establishment of industrial parks in the region that simulated a 'Singapore-styled' business environment in the emerging economies (Perry and Yeoh, 2000; Sitathan, 2002). With regionalization, unique set of benefits and competencies could be utilized to create economic space for local and Singapore-based multinationals to redistribute their resource-dependent operations. Location advantages were foreseen to enhance the competitiveness of Singapore-based companies by enabling it to redistribute particular operations to reap such benefits. Not only is cost-competitiveness enhanced, Singapore is developed into a high-value investment hub with strategic linkages to resource-abundant locations in the region. Singapore's reputation and competitive strengths in infrastructural development and management supplement the location advantages of these strategic sites.

Against this backdrop, this paper explores Singapore's move into India with the establishment of the International Tech Park Limited in Bangalore. The objectives of the paper would be first, the extent to which the park has managed to achieve the 'regionalization' objectives in terms of reaping location-specific advantages and second, the successful exportation of Singapore's strengths to the park.

The theoretical considerations for supporting the project are included in the next section. The theories mainly include Dunning's Investment Development Path (IDP) and the Eclectic Paradigm which corroborate Singapore's recent economic move of directing investments outwards, into parks abroad. The subsequent section takes a closer look at the progress of the International Technology Park Limited (ITPL), and examines the challenges confronting this flagship project. The analyses are further reinforced by our survey results and in-depth case studies of the Park's tenants. The final section considers the implications of the new evidence on Singapore's broader regionalization initiative.

THEORETICAL CONSIDERATIONS

Dunning's Investment Development Path

Dunning Investment Development Path (IDP) is key in explaining Singapore's heavy foreign direct investment offshore after more than two decades of receiving substantial foreign investment. Dunning (1981) and Dunning & Narula (1996) put across that a country's net outward investment (NOI, outward FDI minus inward FDI) is systematically related to its economic development. The IDP relates conceptualizes a U-shaped relation between economic development and a country's net outward investment position.

Net inward direct investment usually grows and then declines as economic development takes place. Although a country's infrastructure may be inadequate to support such inward investment

in the beginning of such capital inflows, such investment will continue to increase as the economy grows. Singapore was of the above description during its developmental period from the mid-1960s to the mid-1980s). An increasing growth rate of inward investments was observed. In fact, its long-established stratagem of economic development through foreign direct investments is well documented.

According to Dunning, such inward investment will generate firm-specific assets to facilitate outward direct investment. However, in backward regions it will take longer to accumulate such assets in order to initiate any kind of outward capital flow (Dunning, 1988; Caves, 1996). As time passes, outward direct investment takes centre-stage as incentives for inward investment decrease. This takes place, as along with the reversal of trend propelling investments outward, the country will face an erosion of its comparative cost competitiveness. Singapore experienced this trend with rising business costs in the mid-1980s stifling cost-competitiveness. However, with outward investments to retain competitiveness as a financial resource, the city-state became wealthier and its regionalization strategy came under way.

The Eclectic Paradigm

Location-specific advantages are of utmost importance for the investing country. Following Dunning's IDP, economic development is characterized with the net outward investment position of the country whilst government policy is correlated with economic development to ascertain the pattern of competitive advantages of foreign investors relative to those of local firms (ownership advantages or the O-advantage), relative competitiveness of local bound resources and capability of the country (location advantages, or the L-advantage), and the propensity of foreign and local firms to utilize the ownership advantages internally rather than through markets (internalization advantages, or the I-advantage). Dunning's Eclectic Paradigm explains the above OLI model.

According to Eclectic Paradigm, foreign investment will occur only if it is advantageous to combine spatially transferable intermediate products produced in the home country, with at least some immobile factor endowments or other intermediate products in another country (Dunning, 1988). Simply put, the OLI-model must be satisfied. In other words, there needs to be a balance between the three criteria. Dunning goes so far as to comment that the OLI triad of variables may be likened to a three-legged stool, each leg supportive of the other and the stool is only functional if the three legs are evenly balanced (Dunning, 1998). The third leg is considered the most important as it completes the balance. It can hence, be drawn that the location-specific advantages associated with the Indian venture form the third leg of the stool, it being the single-most important reason for Singapore's foray into India.

Traditional location theories dealt with asset-exploring activities which were designed to maximize the firms' current efficiency whilst identifying the transaction costs and benefits of neighbouring activities. Contemporary theories postulate that in locating their activities within a limited spatial area, firms maximize the benefits of dynamic learning economies at the same time minimizing transaction costs associated with space (Dunning, 2000a, 2000b). Firms' strategic choice of location reflects twin aims; to not only transfer their resources to the host countries, but gain access to the available strategic assets as well (Dunning, 1995; Porter, 2000a, 2000b; Makino and Delios, 1996; Chen and Chen, 1999; Frost, 2001).

REGIONALIZATION: ESTABLISHMENT OF THE INDIAN PRESENCE

The growth of Singaporean industrial parks in numerous countries such as Indonesia, China, Vietnam and India can be attributed to the regionalization venture undertaken. This paper will be focusing on the latest regionalization endeavour in Bangalore, India. The positioning in India in 1994 could not have been at a better timing. The strategy India used in the early 1990s was similar to what Singapore had done in its early years of development. India opened its doors to foreign investment as part of a determined liberalization procedure in order to boost economic

growth. Singapore responded positively which led up to the establishment of the International Industrial Technology Park (ITPL) in Bangalore, the country's IT capital.

There were several location specific benefits proposed by India, which prompted Singapore to set up an industrial park in Bangalore. There was cheap and bountiful availability of skilled and unskilled labour, abundant land resources coupled with cooperative and encouraging attitude of the Indian government. It was a myriad of advantages for Singapore if it were to relocate some of its operations in India. The government of Singapore had not only identified this golden opportunity, but had distinguished that an Indian park could translate into more benefits than some of its already established parks. Its information technology boom supplemented with the vast disposal of IT facilities and highly-skilled software specialists provided Singapore an avenue for building a technology park wherein high-end activities could take place. Hence, ITPL presented Singapore a unique set of advantages while other parks engaged primarily in manufacturing or "operation" activities.

The next section of the paper delves further into ITPL, giving a description of its functioning and characteristics.

International Technology Park Limited (ITPL)

Located 18km away from Bangalore, ITPL was set up as a pioneer for a new generation of Singapore-developed IT parks in India. The idea was further deliberated in 1992, by the then Singapore Prime Minister Goh Chok Tong and Indian Premier, P.V. Narasimha Rao. Construction began in 1994 and the park was officially inaugurated in 2000. A Singapore consortium led by Ascendas International, India's Tata Group and the Karnataka state government partnered the project in a 40-40-20 arrangement. The Singapore consortium and the Tata Group have since increased their respective stakes to 47 percent each while the state government has reduced its stake to 6 percent.

A Singaporean prescription, the 'work, live and play' concept was adopted by ITPL's development. On top of that, features specially to appeal to potential tenants in the targeted IT and high-tech industries were guaranteed. ITPL assures uninterrupted telecommunication facilities and power-supply, immediate-occupancy business incubator space, and the formulaic 'one-stop' service.

This present day, 106 companies occupy the ITPL, employing around 12,000 people. More than fifty percent are wholly foreign-owned firms and among these are several major players such as AOL, and Infineon. Along with that, 70 percent of ITPL's tenants are involved in software development, integrated circuit design, research and development and precision technology.

Electronic City (EC)

Electronics City is an industrial park with size of over 330 acres, specializing in electronics and the IT industries. It was made known as a software and IT hub in 1994, even after it was mooted by Software Technology Parks India (STPI) in 1991. Currently, it is house to over 100 companies including leading IT firms such as Infosys and Siemens. The entire infrastructure is maintained by Keonics, a government-linked management company. Also, to have close watch of the movements of the industry, STPI has its headquarters in Electronics City itself.

The main variation between ITPL and Electronics City is that Electronics City is a hub city that houses different IT and electronics companies in their own private buildings. State-owned buildings, are however, occupied by smaller companies because of the low rental rates and basic facilities.

EMPIRICAL FINDINGS

ITPL's competitive advantages as an investment location is rooted in the two-fold strategic intent mentioned in the introduction. However, to adequately assess the impact of the various pull factors and constraints faces, as a measure of ITPL's success, the paper adds a 2-pronged approach featuring on-site questionnaire survey analysis and in-depth case studies of selected firms in ITPL and EC.

Logistic Regression Analysis

In order to obtain primary data from the parks, surveys of the tenants of ITPL and Electronic City were administered in December 2004. 40 door-to-door survey questionnaires were completed – 14 from ITPL and 26 from EC. 3 of the ITPL and 19 of the EC firms are wholly-Indian owned, while the rest are either joint venture or foreign. 7 surveyed ITPL firms and 18 surveyed EC firms each employs less than 100 people.

Apart from analyzing the descriptive statistics and popular rankings on the responses relating to factors and constraints, a logit model² was applied to compare the perceived advantages influencing the tenants' decision to locate in the case-study parks. A similar model was also applied to the constraints faced by the tenants in these parks. The logit estimations are set out in Tables1 and 2 respectively.

From the result of the binary logistic regression, we seek to ascertain whether firms choosing one particular factor in the question will be more likely to be from ITPL or EC, *ceteris paribus*. When the coefficient of the estimates is positive, firms picking the factors are more likely to be from ITPL and when the coefficient is negative, they are more likely to be from EC.

² The logistic regression model both for the pull factors and constraints takes the following form:

$$P_i = \frac{e^{Z_i}}{1 + e^{Z_i}}$$

Where:

P_i = probability of firm being located in the particular park

Z_i is a linear function of the push/pull factors defined as

$$Z_i = \alpha_0 + \sum_{i=1}^n \alpha_i F_i$$

Where:

F_i = 1 if factor i is selected, 0 otherwise

α_0 = constant term

α_i = coefficient of independent (explanatory) variable

Estimated coefficients in the logit model, if statistically significant, would suggest that the firm choosing that particular advantage/constraint is more likely to be a factor among tenants in that particular park than in those from the other industrial parks included in the survey. For example, where ITPL is the dependent variable, if the coefficient of F_1 is *positive* and *significant*, this would suggest that, after taking into account the effects of other advantages, a firm choosing 'Support from local authority' has a higher probability of being a firm located in ITPL i.e. support from the Indian authorities were a significant pull factor for ITPL tenants, *as opposed to* tenants in EC.

Factor's Influencing Tenants' Decision to locate in ITPL and EC

(insert table 1)

"Investment incentives" is the factor stated by significantly more tenants from EC, vis-à-vis ITPL. This is also supported by the negative and statistically significant α_2 ($=-2.122$). These incentives appeal to the EC's target market, which are mainly start-ups and SMEs. For these small firms, these incentives are vital to enabling them to survive despite stiff competition from the major industry players. With ITPL targeting the more established corporations, their tenants would be less likely to be influenced much by these incentives.

In addition, we also note that agglomeration plays a significant role in EC's attractiveness to investors. The presence of major buyers and competitors influenced tenants during their decision to locate in the park. This is as evident from negative α_4 and α_5 ($=-2.632$ and -2.399 respectively). From this result, it appears that EC caters mainly to electronic companies which value being close to their buyers and competitors.

The positive and statistically significant α_3 ($=2.543$) also suggests that reliable infrastructure facilities are more important factors for ITPL tenants compared to their counterparts in EC. This is not surprising, given the establishment of the Singapore model in the park which is associated with reliable infrastructure and facilities. Investors who are able to recognize this factor are hence more likely to favour ITPL.

(insert table 2)

However, in terms of constraints faced by the tenants in ITPL and EC, our logits estimates suggest that there are no significant differences in this aspect. This is as ascertained by our insignificant test statistics highlighted in table 2.

CASE STUDIES

2 case studies from each park are presented in this section. Cases of both small and big firms of each park are represented so as to give a holistic picture of the parks.

ITPL-Company A

Company A is a low-cost software development and customer service centre of a US interactive services company. It employs over 1,000 employees in ITPL to service 35 million global online subscribers. It has a well-equipped facility of 110,000 square feet, enabling for services to be effectively and professionally handled. The international image of the company is illustrated with the one-stop center concept and modern infrastructure. Costs for the infrastructure are split amongst all of the companies in ITPL and not just spent by company A. Hence, there is significant cost savings in maintaining such an infrastructure. As like-minded people gather together in the software cluster, it is a base that spurs the exchange of ideas as well as encourages competition in retaining the brightest. Despite this, a high labour turnover is still experienced as the demand for IT professionals increases.

ITPL-Company B

Company B deals with software development for its US parent company, a premier provider for wireless and enterprise networks. First established in 2002, ITPL was the best location choice for the company, for there were no close competitors. Today, close competitors burgeon in more ideal locations. ITPL's plentiful advantages were decision-making factors for Company B's choice of location. ITPL flexibility allowed built-to-suit facilities for the company and versatility provided full services for all its tenants ranging from the shuttle bus services to travel services. There was also peace, away from the hustle of the city. However, a major concern is the employment and

retention of labour. As the demand for IT professionals propels further, this is going to be a major problem especially for smaller companies.

Electronics City – Company C

Company C is a subsidiary of a German company. It manages 60-70 percent of its global software development. Along with that, they also serve a private pool of companies. Its main agenda in Bangalore is developing customized healthcare software for its clients. It has 1100 employees in Bangalore alone. STPI in Electronics City is an advantage for this company as they provide the basic necessities such as satellite communications and infrastructure. The big companies cluster in EC, empowering them over STPI to bring about favourable changes to their advantage. When ITPL was set up in 1994, the company did not express interest in moving over, having their own building with space for extension. The two factors that will continue to keep Company C in EC are the low land costs and logistical advantages of keeping the company's departments together to ensure efficiency and synergy. The key issue however would be the city traffic congestions. Workers rush to beat the evening traffic, reducing maximum productivity. With an opportunity to work in the city, many employees may think of switching over.

Electronics City – Company D

Company D is a small public limited company with 15 employees located in the same building as the STPI headquarters. The rising software development unit in embedded systems focuses on mainly on quality. Its main client is the government. Starting 8 years ago, its aim was to be one of the forerunners in embedded systems within the next 10 years. Their reasons for choosing EC are firstly, the good facilities provided such as satellite communications and secondly, to stay close to its main client, STPI. Even being a small company, Company D also garners strong support from the government. The government tends to be more flexible when it comes to late rental payments. Its main concern would be the traffic problems for the workers. Although it is small firm experiencing traffic jams followed by a long walk into the vicinity, the company' is too small to have transportation provided.

ISSUES AND CHALLENGES

The huge difference between the tenants at ITPL and the other Singapore-styled industrial parks in Indonesia, Vietnam and China, is that these other parks have attracted a majority of their tenants on the basis of abundant low-cost, low-skilled labour. ITPL has a somewhat different scenario. Gathered from our study, plentiful and cost-effective labour is not the primary influencing element in driving firms to the park. It has been found that the excellent infrastructural facilities and the Singapore-styled management characterized as quintessential efficiency of the ITPL have been the main reasons, which encouraged the firms to the park. From anecdotal evidence of our on-site interviews, international firms, such as Company A, B and C, have moved to ITPL from other locations for these reasons. Furthermore, the advanced technology made available at ITPL, has helped make the park the cynosure of all companies engaging chiefly in non-manufacturing industries, that is, those placed in the higher end of the value chain.

Theorists looking from the firm's perspective have asserted that along with the production process being viewed as a value chain [9] [18], the firms should also determine comparative or location-specific advantages unique to each country/territory [5], which will serve to complement the competitive advantage they enjoy as a result of being placed higher up in the value chain. Moreover, with the increasing phenomenon of globalization, changes in location-specific advantages are bound to take place to complement the increasing spatial integration of complex and rapidly changing economic activities. Alterations of the advantages are not the only consideration. The role of national and regional holistic approach in their influence over the extent and structure of localized centers of excellence [6] must not be ignored. Therefore, when taking into consideration firm-oriented competitive benefits as well as comparative advantages offered by the regions, a holistic approach must be adopted. Synergistic efforts will take place if a strategic fit between the competitive and comparative advantages exists.

ITPL represents a modified version of the Porter-Kogut analytical framework, whereupon the park has witnessed the location of firms engaged in marketing and sales, and other services (viz, the primary activities), which were supported by other activities such as technological development and infrastructure within the park (viz, the secondary activities), sufficiently provided by the Singapore partner. A classic example is the fast growing BPO industry, and the innumerable e-services, including telemarketing and customer sales service, by using full use of the telecommunication facilities that the park showcased, as substantiated by our case studies. Technological developments are made constantly to accommodate entry of new firms, and expansion of existing ones. Management at ITPL and the government support are the park's different selling proposition. ITPL is also qualified with many location-specific advantages to support high value-added processes, which are a blend of technology and infrastructure on one hand, and competitive skilled labour on the other.

Despite ITPL succeeding in providing the crucial links within the value chain that give client firms a competitive advantage, a setback is nevertheless inevitable. The problem arises on the flip side of the desired strategic fit – the host country's ability to provide comparative advantages. Looking from this perspective, India has excelled only in making available the advantages of 'factors of production'. Some of the components of comparative advantage provided for by ITPL and not the host country are not supplemented with the necessary infrastructure outside the park, where roads to supporting administration continue to be nearly non-existent. In fact, the success of the infrastructure within the park is not attributed to the Indian endeavour. Factors which Singapore sought to make full use of, such as the economic and political advantages, were initially present. Furthermore, while establishing the park, the Indian and the Karnataka government aligned their objectives with those of its Singapore counterpart. However, as most other government-run projects, the state had not made further inroads into the project with its support. Instead, much of the work was left to the private sector and the Singapore consortium. The state government has since reduced its stake in the project to a mere 6 percent.

Heightened competition

With the development of several other similar cost-effective parks in the same vicinity, Singapore's overseas industrial parks are starting to lose its appeal. ITPL's main success is attributed to the 'Singapore-styled design and management' reputation, and its capacity to provide stable electricity is the only contrast from other IT parks like the Software Tech Park and Electric City. The limelight on the formulaic 'one-stop' service and self-sufficient infrastructure of the ITPL is now being deliberated. ITPL's listed lease is priced at Rs50 (approximately US\$1) per square foot, while just outside ITPL, Electric City is offering less than Rs15. ITPL tenants suggested that the park's allure may be diminishing with more IT parks and companies offering lower rentals with reliable energy set up within the vicinity to capitalize on the area's repute.

Political 'Patronage'

Political patronage (and personal ties) rather than transparent contracts have had their good and bad. In India, ITPL's competitive advantage is dependent on the commitment and support of the different state governments towards the country's development. Even as cities such as Hyderabad, Mumbai and Chennai continue to advance technologically, there are a few factors that serve as deterrents to investors; the lack of good supporting infrastructure in the surrounding environment and the disparity in local state-government supporting different cities. Although corruption remains endemic, bureaucratic red-tapism is difficult to curb. These considerations act as deterrents to investors in themselves, even with Singapore's presence and involvement.

CONCLUSION

ITPL proves to be a refreshing change in Singapore's series of overseas investments. It showcases a unique blend of high-value added activities performed at comparatively lower costs. The park has attained considerable success in furnishing Singapore with location-specific advantages. However, as mentioned in the above section, the location specific advantages don't come without numerous other limitations. Singapore's presence in the park thus goes a long way in eliminating many of these limitations so as to provide companies looking to settle at ITPL with an advantageous location. Hence, it is a combination of the proffered Singaporean experience and country-specific comparative advantages that help to attract corporations to ITPL.

ITPL's success hinges on the "Singapore-styled design and management" reputation. In a country where corporate image is of immense importance the Singapore presence contributes tremendously in enhancing this image. The city-state is world renowned for its management skills, disciplined efficiency and corruption-free administration. The effects of all these strengths can be seen at ITPL, where considerable premium is placed on the Singapore presence. As a result, the park has successfully leveraged on this reputation of reliable infrastructure to motivate companies to relocate to these areas where such facilities are an anomaly. The park has been attracting investors with its formulaic one-stop service within a self-sufficient, self-contained environment, which is unburdened by inefficient administration. For example, ITPL is being used by many tenants to establish their brand-image, as there is prestige associated with being located in, what is locally known as, the "Singapore Park".

ITPL has provided considerable location-specific comparative advantage in terms cheap and plentiful labor. Its contribution also extends to the nature of labor provided that enable high value-added activities within the park, making readily available high-quality software developers and IT personnel, as well as a pool of competent graduates, for various operations within the park. India has been one of the biggest beneficiaries of the global shift of high-wage professional jobs to low-cost countries (Straits Times, August 2003). The supply of qualified, English speaking professionals at lower costs has given the country an edge in wooing foreign companies.

With liberalization efforts favouring the entry of MNCs in India, the government support and the influence of inter-governmental relations cannot be ignored. ITPL shares the characteristic of active government involvement, with the Indian counterparts being the Karnataka state government and the Tata Group, which, though private, is well connected with the authorities. The strategic alliances between Singapore's government-linked companies, and its counterparts in the regional sites, were instrumental in mobilizing the resources to complete these multi-million projects.

Finally it must be noted that the sprouting of numerous other parks not only in India, but also in the vicinity as ITPL – parks such as Software Tech Park and Electronic City – has heightened the competition amongst these parks in trying to attract foreign enterprises. However, ITPL's differentiating factor lies in its Singapore connection which proves to be an important marketing edge over technology parks in the country.

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Table 1

Factors Influencing the Respondents' Decisions to Invest in ITPL and Electronics City

Factors affecting choice of tenants to locate in the park	ITPL Frequency	Electronic City Frequency	Maximum Likelihood Estimates - Binary Logits	
			α_i	p-value
Support from local authority	6	15	-0.662	0.470
Investment incentives	4	15	-2.122	0.045*
Reliable infrastructure facilities	9	11	2.543	0.023*
Presence of major buyer	2	9	-2.632	0.029*
Presence of major competitors	1	7	-2.399	0.075*

Source: Questionnaire survey

*** Significant at 1% level
** Significant at 5% level
* Significant at 10% level

Table 2

Constraints Faced by Tenants in ITPL and Electronics City

Factors affecting choice of tenants to locate in the park	ITPL Frequency	Electronic City Frequency	Maximum Likelihood Estimates - Binary Logits	
			α_i	p-value
Rising labour cost	5	10	-1.639	0.185
High labor turnover rate	1	7	-1.180	0.361
Difficulty obtaining capital equipment	3	1	3.101	0.048
Lack of good supporting services	2	8	-0.768	0.501
High or rising overhead cost	4	6	2.350	0.112
Impact of government regulation	1	7	-2.993	0.071
Lack of transparency/ frequent changes in host government regulation	2	4	-0.934	0.453

Source: Questionnaire survey

*** Significant at 1% level
** Significant at 5% level
* Significant at 10% level