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Revisiting the Porter Diamond: Applying Importance Performance Matrix to the Singaporean Financial Cluster

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Working Paper No 05/39

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REVISITING THE PORTER DIAMOND: APPLYING IMPORTANCE PERFORMANCE MATRIX TO THE SINGAPOREAN FINANCIAL CLUSTER

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ABSTRACT
This paper is concerned with employing cluster theory and Porter's Diamond to consider why certain locations are superior for some industries. It argues that it is important for there to be a strategic fit between what industries are assumed to seek and what that location can provide. The strength of this fit can be measured by employing we rename the Factor-Competitiveness Matrix. This approach allows the researcher, or a government agency, to understand exactly how local cluster conditions are valued and evaluated by companies within the cluster. We illustrate an application of the matrix by reporting on a sample of thirty-three participants in the contemporary Singaporean financial cluster. Literature suggests that one main benefit of clustering is the interaction between companies over and above their physical co-existence and so we report on the attitude of the same sample to thirteen commonly held views about cluster benefits.

INTRODUCTION

This paper is concerned with employing cluster theory and Porter's 'diamond' to consider why certain locations are superior for some industries. As pointed out by Martin and Sunley (2002), the diamond theory is the spatial manifestation of clustering. The authors acknowledge that Porter's framework (1990) is contentious in that it seems to have as many supporters as detractors. However, it is an excellent organising framework through which to understand complex social phenomenon. In this paper, we reintroduce the Importance Performance Matrix (Martilla and James, 1997) as a tool for actualizing the important factor conditions in Porter's Diamond at the regional cluster level. This technique allows the authors to ascertain what really matters to firms and executives who have chosen to be in a particular clustered location. As such we are focusing one part of the wider thesis.

We illustrate our arguments through a case study on the clustering of contemporary financial services firms in Singapore. Apart from the intrinsic interest in considering this sector and country, the case highlights several issues with the application of Porter's Diamond, namely, that despite the worries of some critics, we can apply the model to young, open economies; that we can focus the arguments down to a practical level; that it is the cluster that drives the outcome rather than the firm or the nation; and that the diamond is a viable framework. We hope that others may consider that employing the Importance Performance Matrix is a worthwhile approach for other economic clusters. In this paper the data for demonstrating the application of the Importance Performance Matrix is taken from a small questionnaire survey undertaken in August 2003. Data was collected as part of a face-to-face interview, or we asked the interviewees to forward the questionnaire to the most appropriate colleague.

This paper proceeds by reviewing the literature on Porter's Diamond and clustering and then introducing a contemporary case study on the Singaporean financial cluster. We then use the Importance Performance Matrix to see how, in practice, this cluster fulfils important cluster conditions. Because it is the relationships within a cluster that generate their unique dynamics we briefly consider such. Finally, we draw the practical and theoretical lessons from this approach.

DIAMONDS AND CLUSTERS

A decade and a half ago Michael Porter (1990) posed a fundamental and challenging question - why do some nations succeed whilst others fail in international competition? Whilst some have found his arguments contentious and less well grounded in relevant economic theory than, say, his five forces analysis -his work on international competition remains an important and compelling part of the academic landscape on competitive advantage. For this paper Porter's Diamond is used as a model to organise our arguments and drive out our conclusions on practice and policy.

The unit of analysis that Porter focuses upon is not the nation itself at the macro level but the firm and he argues that nations are most likely to succeed where their firms exhibit a favourable diamond of national advantage which captures the inter-relationships and interdependencies between their innate factor endowments. Porter makes one further crucial assumption that a nation's most globally competitive industries are likely to be geographically clustered within that nation. As neatly captured by Martin and Sunley (2002):

"the competitive diamond is the driving force behind cluster development, and simultaneously the cluster is the spatial manifestation of the competitive diamond"

Whilst clusters such as Silicon Valley, Route 128 Boston and The City of London are vibrant exemplars in practice, however, concentration alone does not make for a viable cluster. One needs to look inside the cluster itself and to pay due regard to its history. Positive feedback, strategic fit and the level of networking all contribute to how well a cluster functions. This paper therefore concentrates on a particular cluster - the Singaporean financial cluster and uses the Importance Performance Matrix (Nielsen, 1983; Martilla and James, 1977) to consider particularly the issue of strategic fit. By concentrating upon a single cluster this papers attempts to overcome two problems - the variable, and complex, explanations that surround the development and survival of clusters, and that, one of the criticisms levelled at the Porter Diamond approach is that it too generalised an explanation when we seek to apply it across nations (Davies and Ellis, 2000).

Porter (1990) argued that the creation of such competitive advantage does not happen merely by chance. He contended that there are four key determinants that together constitute the 'diamond of national advantage'. The four determinants are: factor conditions; demand conditions; related and supporting industries; and firm structure, strategy and rivalry. Exhibit One shows the elements of the basic model.

It is not the purpose of this article to provide a detailed critique of the Diamond, for readers particularly interested in this debate then Oz (2001; 2002) and Davies and Ellis (2000) cover the wide spectrum of views from those academics who see the work as a simple and insightful framework with which to understand complex and important competitive conditions through to those who see it as too simplistic an abstraction of economic reality. In particular, contentious debates have arisen as to whether the model is appropriate for small, open, less developed economies as well as the extent to which the multinational structure of international business renders the model inappropriate.

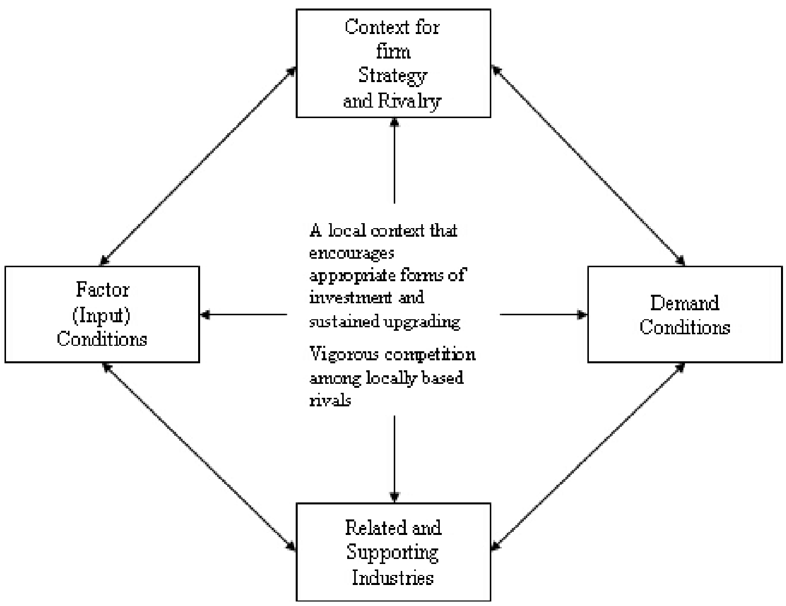
Some critics would argue that Porter shifts between national and local, or industry specific, competitiveness and places too great an emphasis on the role of home based companies when the driving force is the multinational company (see, Davies and Ellis, 2000; Dunning, & Lundan, 1998). Other critics consider that culture is under-represented in the analysis and that a 'double-diamond' approach that places the economy in its proper international context is preferable (Shaughnessy, 1996; Moon et al., 1998). Clancy et al. (2001) and Brouthers et al. (1997) provide interesting insights into the application of the Diamond in Ireland and the Netherlands respectively.

We now consider clusters, innovation and competitive advantage from essentially a Porterian perspective, then draw on another mainstream approach - 'agglomeration', and conclude by reviewing the work on positive feedback which is at the heart of cluster dynamics. Martin and Sunley (2002), Porter (1998a:197; 1998b-c), Rosenfield (1997:4) Roelandt and den Hertog (1999:9) Swann (1998:1) and Feser (1998:26) have all offered definitions of clusters or contributed to their precise definition but from their, and other work, one can discern three main elements.

Firstly, a cluster must consist of groups of associated and interconnected firms that are linked vertically and/or horizontally through their commonalities and complementariness in products, services, inputs, technologies or outputs activities. Secondly, clusters are physical proximate groups of interlinked companies which can encourage the formation of, and enhances value creating benefits via their interaction. Lastly, co-location itself does not imply clustering when these associated clustering benefits like innovation, productivity, growth or other superior competitiveness cannot be shown or described.

Porter (1990) defines clusters in the Competitive Advantage of Nations as being: groups of interconnected firms, suppliers, related industries and specialised institutions in particular fields that are present in particular locations. Innovation,

EXHIBIT ONE: PORTER DIAMOND



Modified from: Porter, M.E. (1998), On Competition, HBS Press, page 325 improvement and change is seen to be central to creating competitive advantage. Moreover competitive advantage is seen as encompassing the entire value system comprising the value chains of the firm, suppliers, channels and buyers. The very strongest of competitive advantage often emerges from within a geographically localised cluster. Arthur (1990) noted that strong clusters tended to attract more firms and those regions with a strong innovative record have an advantage in achieving more innovation: they become 'self fulfilling', that is path dependent. Baptisa and Swann (1999) and Baptista et al (1996) argue that not only does a region that has an accumulation and concentration of knowledge attract increased human capital but that as information exchange matures, and becomes more informal and intangible that the spread of knowledge becomes limited outside of that area. Of course clusters are dynamic in their character and so it is not surprising that innovative activity and output are positively correlated with new firm entry and productivity growth in the cluster.

Both Oakey (1985) and later Porter (1998c) considered how the boundary would be set for a cluster and in essence this would depend upon the nature of the linkages and complementarities across the industries and institutions that are the most important for that industry in its search for competitiveness. Oakey (1985) argues that for Silicon Valley not only is there the advantageous infrastructure, but also because transactions and benefits are of high value and transportation costs are relatively small for the consumer that there is no benefit to the consumer in seeking particularly local (to them) suppliers - so firms cluster rather than scatter. Porter (1998c) considers also rather wider clusters and cites examples of "a pharmaceutical cluster straddles through New Jersey and Pennsylvania in the US. Similarly, a chemical cluster in Germany crosses over into the German-speaking part of Switzerland". Oakey (1985) noted that electronics suppliers would lie within a 50-km radius encircling the firm, whilst May et al (2001) noted in the Hi-Fidelity cluster in U.K. suggested a 50-mile range for this proximity.

Whilst one tenet of cluster theory is path dependency, it has to be noted that clusters are not consistently successful, for example, it is only in 2005 that investment returns in Silicon Valley are recovering from the 2000 downturn. Explanations could be that even dynamic clusters are not immune from the economic cycle; that the natural development cycle of the cluster is not synchronised with individual firm lifecycles, or that as clusters mature, diseconomies of scale and/or group think set in and reduce the virtuous cycle. A detailed consideration of this is outside of the scope of this paper but we should note the obvious: both positive and negative lessons can be drawn from clusters and that path dependency may not necessarily be sustainable for the long run. Thus the population of clusters will change. Pouder and St John (1996), Martin and Sunley (2002), Porter (2000:24) all consider inertia and group think in some detail and Swann and Prevezer (1998) consider the notion of lifecycle stages more formally.

A separate stream of thought can be traced through the work on so called industrial districts or agglomeration externalities. This started with Marshall (1890) who in his book Principles of Economics characterised 'concentration of specialised industries in particular localities' that he termed as industrial districts. As such they exhibited three features: external economies in the ready availability of skilled labour; the growth of supporting and ancillary trade; and the specialisation of firms in different stages and branches of production. Marshall (1890) argued that once localisation and specialisation processes had got under way, it became cumulative and socialised in that locality. Although he had described the phenomenon and acknowledged industrial districts as an integral feature to industrial organisation, he did not provide any explanation on how and why it started in certain places and not others. The three features identified above later became core components of the Porter Diamond.

In the urban economics literature we see similar arguments develop, for example Evans (1985) has three drivers: economies and cost reductions as firms locate near to one another; customers thus being able to reduce their search costs through compact comparison 'shopping'; and customers being drawn to an area because of its reputation. Jacobs (1969, 1984) argues for location externalities resulting from geographical agglomeration within the same industry and urbanisation externalities arising from the agglomeration of firms in different industries. One explanation for the growth of great cities such as Manchester or London would be that customers are able to obtain almost everything from one trip to the city centre.

Crucially, it is not just the physical co-existence of business - it is knowledge spillovers - formal and informal, tangible and intangible that drive the competitiveness of the cluster. In short, such spillovers are a broader concept than traditional agglomeration externalities. Rocha and Sternberg (2005) differentiate clusters from industrial agglomerations by the very existence of these rich interpersonal and interfirm associations. Romer (1986, 1990) and Baptista (1996) bring into focus the notion of the crucial role of externalities or spillovers and this is at the heart of Porter's approach. So Romer (1986, 1990) discusses the earlier works by Marshall (1920) and Arrow (1962), and concluded that MAR externalities (Marshall-Arrow-Romer) have positive influences on firms' growth as knowledge accumulated by one firm would help the technology evolve in other firms. Industries that are regionally specialised would benefit from the within-cluster transmission of knowledge and therefore should grow faster on the whole of being together (Baptista, 1996). In practice spillovers resulting from contact with other firms or institutions do not simply influence technological innovation and productivity. They have a wider range of effects such as altering the financing, marketing, managerial and organisational practices of the beneficiaries and through affecting firm growth changing the nature of the market structure. Knowledge spillovers arise from everyday contact, networking through geographical proximity, as well as from formal arrangements such as joint-ventures and joint research work with Universities. The relationship between the firm and the cluster is bi-directional not only does the activity of individual firms define and shape the behaviour of the cluster but individual firms benefit from being within the cluster. Many authors investigated into the rate of growth of the firm as a function of the strength of the cluster in which it is located and whether strong clusters attract a disproportionate number of new start-up firms (see, for example: Porter 1998c; Baptista and Swann, 1999; Beaudry et al., 1998; Cook et al., 1999; Pandit et al., 2001: a-b, 1999; Swann et al., 1998; Swann and Prevezer, 1996).

Companies in vibrant clusters can tap into an existing pool of specialised and experienced capital resources, thereby lowering their search costs and time wasted on the learning curve (Porter, 1998c). On the other hand, vibrant clusters like Silicon Valley are able to attract specialists to the cluster, who felt that they actually work for the cluster (via job hopping and cross sharing of resources) rather than for one firm alone (Saxenian, 1994). Clustering makes it earlier to benchmark against other players in the same industry; to measure and compare performances because local rivals share general circumstances. Companies within clusters have intimate knowledge of their suppliers' costs and managers are able to compare costs and employees' performance with other local firms - this is also a result of close working relationship with each other.

Proximity improves communications and relationships with the suppliers as well. It could induce instantaneous support from the supplier to the incumbent firm like debugging and installation even on short notices during night breakdowns. Saxenian (1994) noted that joint developments with the suppliers were common during the start-up phase of Silicon Valley. Porter (1998c) also observed that a well-developed cluster provides an efficient means of obtaining important input linkages such as a deep and specialised supplier base located within the proximity. The importance of such input and output linkages cannot be overemphasised in defining the effects and advantages of the clustering phenomenon.

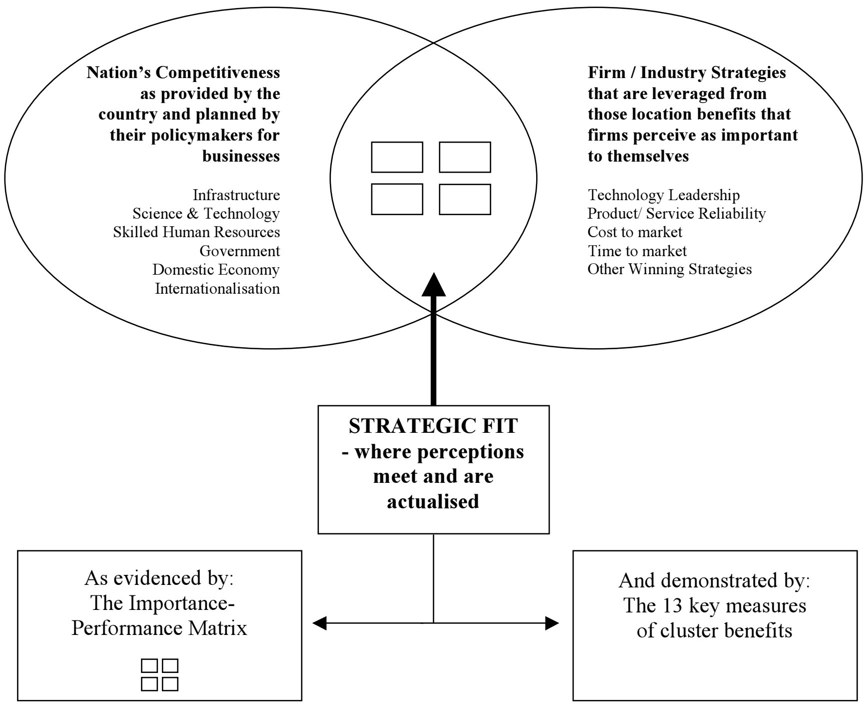
Positive feedback is seen to be playing a central role in clusters (Baptista and Swann, 1999; Beaudry et al., 1998; Swann et al., 1998; Swann and Prevezer, 1996). Because demand and supply conditions as well as non-market spillovers are better in a cluster than in isolation (Martin and Sunley, 1998) not only does this promote the growth of incumbent firms but it also attracts the entry of new firms. This growth and entry increases the intensity of agglomeration and so promotes further growth and entry which begins to accelerate once a cluster has reached a critical mass (Pandit et al., 2001a). Porter (1998c) also acknowledged that the positive feedback loop within a cluster and that the formation of new businesses amplifies the benefits of clustering. Other extraneous effects from this positive feedback include a higher rate of productivity growth (Henderson, 1986), more prolific innovation (Baptista and Swann, 1999) and significant information and knowledge spillovers (Oakey, 1985). However, the feedback will not remain positive indefinitely. Beyond some saturation point, congestion and competition might slowdown the growth and entry of individual firms, and eventually even contributing to the decline of the cluster. This is suggested by Porter and is consistent with the argument on a cluster life cycle theory advanced by Swann et al. (1998). Earlier work within the urban economics field (Henderson, 1986) found strong evidence that industry location raises factor productivity and that being part of a cluster allowed companies to productively source for inputs; access information, technology and institutions; and coordinate with other firms both horizontally and vertically. For Porter it is such increased factor productivity that is, the created competitive advantage.

In addition to the externalities associated with cluster strength, the dynamism of a cluster will be influenced by a number of regional fixed effects or attributes. These fixed effects are attributes, which influence the attractiveness of a cluster, but are not themselves changed as the cluster expands or contracts (Swann et al, 1998). A country could be competitive in numerous attributes that are important to businesses, such as the presence of a strong government, stable financial institutions and good transport infrastructure but not develop a viable cluster. One could argue that two drivers in particular determine the outcome. One would be strategic fit - can the cluster exploit the existing factor conditions and from these leverage positive feedback. In this paper it is the first driver that we consider in particular and through the use of the Importance-Performance Matrix we attempt to measure=re and capture such a strategic fit (Exhibit Two)..

THE SINGAPOREAN FINANCIAL SERVICES SECTOR
The purpose of this section is to provide some context for our application of the Porter Diamond, cluster theory and the Importance-Performance Matrix. If we are to understand competitiveness at the cluster level then we need to be able to see into the often subtle and micro aspects of such, however we need to be able to strike off a balance for the reader between too little depth of description and too much breadth. In this section we concentrate on some broad financial history, a discussion of financial markets structure and then focus down to banking through applying the Porter Diamond to the sector (Exhibit Three) and then offer Exhibit Four as a ‘pen sketch’ of the economic history of the three leading domestic banking groups.

The clustering of financial services is sometimes thought to be less important than other clusters in, say, biotechnology or industrial parks. This might be because public bodies responsible for developing clusters at the regional level simply see financial and business services as the backbone of industrial activities and thus ignore them as a cluster in their own right. However those studies that have looked into financial services clusters (see, for example: Pandit et al, 2001a & b, Beaudry et al, 2001) have demonstrated that they display similar characteristics in terms of growth and entry of firms to other clusters in biotechnology, computing and broadcasting. However, most of these studies were done at the macro-level and did not reveal much insight at what actually goes on in the cluster.

EXHIBIT TWO: STRATEGIC FIT AND IMPORTANTANCE PERFORMANCE MATRIX



Singapore is a small country with little endowed factor condition and has been keen to succeed as an offshore banking and financial centre since the formation of this Asian Dollar market. With a land area of 685.4 square kilometres and population estimated at 4.19 million in 2003, Singapore has attracted many foreign banks and institutions to set up operations over the last three decades. In its own right, Singapore has a vibrant banking cluster with about 107 banks (www.mas.gov.sg) and is the world's seventh largest holder of foreign currency reserves at US$bn85.8 (May 2003). There are approximately 3.9 banks per thousand of the population. About 97% of these are foreign banks with most of them involved in regional industrial investment or private banking activities.

From the late 1960s, Singapore embarked on its development as an international financial centre. With sound financial and economic fundamentals, favourable political and business environment, skilled and highly educated workforce, good infrastructure and telecommunications facilities, and strategic location, Singapore had attracted many reputable international financial institutions over the years. The financial centre offered wide ranging financial products and services such as foreign exchange, derivative products, trade financing, loan syndication, securities trading, specialised insurance services, capital markets, assets management, underwriting, and financial advisory services, some of which were recognised as world-class. In 2002 the sector contributed 12.3% to GDP and it was one of the main pillars of the economy (Economic Survey of Singapore, 2002).

This financial services cluster has been both actively supported and promoted by the Monetary Authority of Singapore (MAS) for the last thirty odd years since the first Asian Dollar market was attracted to Singapore in 1968. In 1970, Parliament passed the Monetary Authority of Singapore Act leading to the formation of MAS on 1 January 1971. This Act gives MAS the authority to regulate all elements of monetary, banking and financial aspects of Singapore. MAS' Mission is to promote sustained non-inflationary economic growth, and a sound and progressive financial centre. Following other initiatives to widen and harmonise MAS' functions it now administers the various statutes pertaining to money, banking, insurance, securities and the financial sector in general. Following its merger with the Board of Commissioners of Currency in October 2002, it has also assumed the function of currency issuance. (www.mas.gov.sg).

The U.S. Singapore Free Trade Agreement (USS FTA), signed on 15 Jan 2003, was a landmark event that helped further develop financial services in Singapore. At that time (actually 2001) two-way trade between the U.S. and Singapore totalled $33 billion and it was the 11th largest U.S. export market worldwide. By then more than 1300 American companies had a presence in Singapore, with about 330 of these having made Singapore their regional business headquarters. Continuing globalisation can only bring about more opening up of free trade areas and deregulation of financial services.

FINANCIAL MARKETS STRUCTURE

The successful development of this regional financial centre resided in its market activities and transactions and these included the: Asian Dollar market; Asian Dollar Bond market; Money market; Foreign Exchange market; Capital market, Stock market; Gold market; Future market and Commodity Exchange.

The Asian Dollar market or offshore banking activities started in 1968 after Singapore's successful bid against Tokyo and Hong Kong. The Singapore Government offered incentives to the Bank of America to establish the Asian Currency Units (ACU) and deal with deposits in hard currencies (US dollars, Sterling, Japanese yen) to non-nationals. Multinational corporations, commercial banks, other central banks and wealthy individuals (non-resident) traded on the Asian Dollar market with tax-exemption benefits. The Asian Dollar Bond market resulted in 1971 and that attracted many international organisations and national governments to issue Asian Bonds. The total amount of Asian Bond issued peaked in 1989 and 1993 at US$3.5 billion (Tan, 1999)

Singapore had an efficient money market dealing in short term funds and instruments such as treasury bills, short-dated government securities, bills of exchange, and other commercial papers. Total money market investments were S$17.0 billion as of the end of 2003. The capital market in Singapore comprised longer-term corporate securities (bonds and equities) and government securities.

Being a small country that was dependent on trading with foreign partners, Singapore's foreign exchange market was the world's seventh largest holder of foreign currency reserve at US$ 85.8 billion ending May 2003. Exchange control was lifted in 1978, following the floating of sterling in

1972. Singapore has maintained its top position amongst the top four global foreign exchange markets for the tenth consecutive years since 1992, after the UK, the US and Japan. The average daily volume of foreign exchange trading in Singapore for April 2001 was US$101 billion (BIS, 2001). Singapore also ranked 4th in the Over-The-Counter (OTC) Foreign Exchange derivatives turnover. Exhibit Three gives some background detail on the leading overseas and domestic banks. Players in the foreign exchange market were mainly commercial and merchant banks, ACUs, money brokers, and companies managing a multi-currency portfolio.

The Stock Exchange of Singapore Limited (SES) started in 1973 incorporated the Stock Exchange of Singapore Dealing and Automated Quotation (SESDAQ) from 1987 for smaller companies to raise funds. In 1978, the Gold Exchange of Singapore (GES) was formed. The Singapore International Monetary Exchange (SIMEX) replaced the GES and started trading in financial futures in 1984. In 1998, trading on SIMEX was very active with a volume of 27.86 million lots (Tan, 1999). In December 1999, the Singapore Exchange (SGX) was created resulting from the merger of the SES, SEADAQ and SIMEX. The Rubber Association of Singapore Commodity Exchange (RASCE), privatised in 1992, was renamed the Singapore Commodity Exchange (SICOM) in 1994 to incorporate trading in other commodity futures using a computerised network linking Kobe, Tokyo and London on rubber and coffee futures respectively.

Singapore has consistently maintained its top spot amongst the world financial markets as a result of the contributions made by the strong presence of the world leading financial institutions and their conduct of sophisticated financial transactions. In August 1999, the World Economic Forum Global Competitiveness Report ranked Singapore among the most sophisticated financial markets in the world.

EXHIBIT THREE: FULL BANKS IN SINGAPORE RANKED BY ASSETS SIZE, 2002

Territory	No. of Full Banks (% Total)	Banks' Name	Origin	Total Assets Size US$ bn (2002)	Ranked By Total Assets Size
North America	3 (12%)	Citibank NA	USA	1100.0	1
		JP Morgan Chase Bank	USA	758.8	5
		Bank of America	USA	662.4	6
Europe	4 (16%)	BNP Paribus	France	867.9	2
		Credit Agricole Indosuez	France	655.8	7
		ABN Amro Bank NV	Netherlands	627.6	8
		Standard Chartered Bank	UK	119.9	9
Asia	18 (72%)	Sumitomo-Mitsui Bank Corp	Japan	825.4	3
		HSBC	Hong Kong	759.0	4
		DBS Bank	Singapore	84.9	10
		UOB Bank	Singapore	60.9	11
		OCBC Bank	Singapore	47.8	12
		Malayan Banking Berhad	Malaysia	39.4	13
		Bangkok Bank Public Co Ltd	Thailand	29.9	14
		Bank of India	India	16.7	15
		Indian Overseas Bank	India	9.0	16
		Indian Bank	India	7.7	17
		UCO Bank	India	7.6	18
		Bank of Tokyo-Mitsui Ltd	Japan		
		Bank of East Asia Ltd	Hong Kong		
		HL Bank	Malaysia		
		RHB Bank Berhad	Malaysia		
		Southern Bank Berhad	Malaysia		
		Bank of China	China		
		PT Bank Negara Indonesia	Indonesia		
Total	25				
Notes:	2 locally incorporated banks not included				

THE BANKING INDUSTRY

The Monetary Authority of Singapore (MAS), the de-facto central bank in Singapore, was formed via the MAS Act (1971) which streamlined the various monetary functions from government agencies into a single body. It conducted monetary policy making; managed the country foreign reserves and government securities; supervised the banking, insurance, securities and future industries; oversaw the function of currency issuance; and promoted Singapore as an international financial centre in partnership with the private sector.

The recent liberalisation (1999-2003) of Singapore's banking sector has had significant impacts on the local banking industry. These include consolidation, the disposal of non-banking related assets and mergers, and this resulted resulting in only three major local banking groups - DBS, UOB and OCBC. The local banking industry was expecting more competition, since for a long time prior to the liberalisation with the exception of 1970 and 1983, no new licences were granted. In Singapore, the banks were constituted either as the 23 full banks, the 37 wholesale banks or the 47 offshore banks depending on their license granted (www.mas.gov.sg) Singapore however had a high ratio of banks per thousand population (3.9) relative to other countries implying that these banks were operating over a much wider geographical are than just the local domestic market. The initial intent of the financial services industries was to provide for Singapore's manufacturing base in the 1970s, and there continued to be a high degree of integration between the financial sector and the manufacturing sector, which were then, and still are, the twin pillars of economic activities in Singapore.

EXHIBIT FOUR (A): PORTER DIAMOND AND THIS SECTOR

Diamond Component	Example or Comment
FACTOR CONDITIONS	
Porter (1990) argues that for a nation possessing basic factor conditions alone, such as a pool of educated labour or a local raw-material source, this does not constitute an advantage in knowledge-intensive industries. Basic factors are defined as generic factors that are available to all general activities, such as roads, airports, seaports and abundance of labour. They are important for resource development and agricultural industries where the requirement for technologies and skills are much simpler. However, lasting competitive advantage is generated out of advanced and specialised factors.	Singapore is an example of a nation that overcame the disadvantages in general factor endowment to create national competitive advantage. A small island-state situated at the southernmost tip of Peninsular Malaysia, Singapore only had a strategic geographical location and excellent natural harbour that was centrally located between the East and the West to make it an ideal place for banks to reside there and develop as an international financial hub. The small population base, (54th in the world (WCY 2004) was turned to its advantage when the government relaxed its policy on the employment of foreign talent and on immigration, this created a positive feedback loop for Singapore's vibrancy. Competent senior managers with international experience were generally available, as were the high-skilled foreign workforce whom was now attracted to the vibrant business environment. Advanced factors for financial services included productivity, communications infrastructure, sophisticated and specialised labour, research facilities, and technological know-how that required time and substantial investment in human and physical resources. Singapore was proactive in forging links with appropriate universities in the USA. Productivity was another advanced factor condition that was key to Singapore's sustained growth. It had maintained a high productivity rate in line with the GDP growth, and labour productivity was also among the highest in the world, and in Asia, second only to Hong Kong. Its workforce had a literacy rate of 93.7% and had one of the lowest productivity days lost in the world. For further factors conditions see the: World Competitive Table below.
DEMAND CONDITIONS	
Porter (1990) postulates that home demand conditions for an industry's product or service formed the second broad determinant of national competitive advantage. Three broad attributes of demand are significant: the composition of demand, the size and pattern of growth, and the mechanism on how a nation's domestic preferences can be transmitted to foreign markets. It is not the size of the home market, per se, that is important but the extent to which it drives innovation: Advantage is created in industries that are the most important in the home market since demanding buyers in the home market pressure companies into meeting high standards. Also because buyers at home needs pre-empt those in export markets companies build up a learning curve advantage: Porter (1990) feels that the sophistication of demand is much more important than the size of demand. When an industry faces a sophisticated and demanding domestic market it is forced to innovate and sell superior products because the market demands high quality.	Manufacturing is the most important sector, followed by business services, financial services and wholesale and retail trade. Manufacturing accounted for 24.3% of GDP in 2002, out of which a significant portion is electronics manufacturing. The wholesale and retail trade dominates the services industries accounting for 14% of GDP in 2002 (Economist.com available at http://economist.com/countries/Singapore/profile.cfm) These activities generated a huge and growing demand for financial and business services to be located in Singapore. Financial services have expanded since 1960, increasing its composition of GDP from 2.6% in 1960 to 12.3% in 2002. The pattern of growth in demand for financial services was analogous to the growth of the Singapore economy. The total value of trade in goods (exports plus imports) was equivalent to 273% of GDP in 2002. This figure includes a large volume of re-export trade, encouraged by Singapore's location and excellent port facilities. Re-exports accounted for 47% of total exports in 2002 (Economist.com). Real GDP in Singapore grew at an average rate of 8.4% per annum between 1965 and 2001 (also see Figure 4.3), although the Singapore economy suffered a contraction of 2.37 % in 2001 and was sluggish with 2.25 % growth in 2002. The growth in demand looked promising as the region was posed to recover. In respect of the sophistication of demand it could be said that Singapore domestic financial consumers were far less demanding and sophisticated due to the historic heavily regulation – importantly the 1999 MAS deregulation introduced more QFB licenses to foreign players and local banks encouraged by the MAS to consolidate their operations to prepare for this further competition The introduction of foreign competition would certainly drive up the sophistication of consumers (buyers) and increase the bargaining power of buyers.

RELATED AND SUPPORTING INDUSTRIES The third broad determinant of the diamond of national advantage is the presence of related and supporting industries that are themselves internationally competitive. The close proximity of related industries ensures a quicker response to market trends and changes, and facilitate rapid innovation. This ensures ready access to the raw materials and skills necessary to create advantage through either low costs or differentiation.	A group of aggressive related and supporting industries can have the most effective influences on the rapid development of the banking and financial industries because they can be cost effective and be a tremendous attractor. The presence of world-class financial markets in Singapore supports the growth and performance, and attracts foreign entrants to the Singapore banking industry (commercial and merchant banks). Singapore has emphasised the development of its information technology (IT) industry. The Information Development Authority (IDA), a government agency, was formed to formulate the IT development policies and the blueprint to develop world class IT infrastructure for the information economy. The IT industry supplied both the hardware and software not only to the financial services industry but also supported Singapore's other major sector - manufacturing. The digital revolution gave rise to an increasingly interconnected world where financial services' consumers, through the electronic medium, could make more informed decisions and had more choices. With over twenty-five local and foreign broadcasters, a well-established publishing industry, a world-class telecommunication infrastructure and a fast emerging Internet sector, the Singapore financial centre was well-supported. Communications and media companies leveraged on their emerging cluster to base their entire value chain of activities from content creation to content packaging and content distribution here (EDB Report: Vision 21). There were many world-class financial information databases providers such as Reuters and Bloomberg who supplied real-time and up-to-date information online to the financial services industry worldwide.
STRATEGIES, STRUCTURES AND RIVALRY The fourth determinant of the diamond for national advantage is the firms' strategy, structure and rivalry. This refers to the manner in which an industry is created, organized and managed and the nature of domestic rivalry that could help a nation achieve a sustained competitive advantage.	During the five-year programme (1999-2004) to liberalise retail banking, six qualifying full bank licenses were awarded to international players - Citibank, HSBC Bank, Standard Chartered Bank, Malayan Banking Berhad, BNP Paribus and ABN Amro Bank.. They were allowed to expand and set up additional branches, off-premise automated teller machines and to share an automatic teller machine network among themselves – practices previously prohibited The three local banks, DBS, UOB and OCBC formed after consolidations in the late 90s / early 2000 were considered to be well placed to compete with the bigger foreign banks. Exhibit xxx provides more detail about their history and strategy. MAS officials asserted that competition, not protection, was the best way to foster the development of strong and large local banks that would be capable of holding their own domestically against the major international banks. Before the financial deregulation in 1999, the seven local banks had their pool of domestic customers and business clienteles from the years of *solidarity*. Whilst the DBS Group, ICB and Keppel Bank focussed on industrial loans and transactions, other banks such as the POSB took most of the retail and personal savings customers. Some banks, like UOB, were diversified ranging from real estates investments to sustaining personal savings market share. Industry rivalry took in the form of jockeying for top positions, price wars and promotions. However the domestic banks competed mainly in the domestic market and largely in the lucrative consumer business segment. During this liberalisation period the MAS announced that they would also increase the number of wholesale banks to cater to more offshore banks and give them greater flexibility in Singapore dollar wholesale business. In June 2001 the three-tier licensing regime (full, restricted, offshore) was replaced by a two-tier system that would only distinguish between full (retail) banks and wholesale (non-retail) banks and eight offshore banks were upgraded to full banks in December 2001. The Government also lifted the 40% limit on foreign shareholdings of local banks, although the MAS emphasized that it would not support a foreign bank actually acquiring a local bank.
CHANCE AND GOVERNMENT	Are exogenous to the diamond but have the potential to affect its operation and dynamic. In this table they are included above under other factors but two examples would be: the winning of the Asian Dollar market and the MAS Policy to encourage competitiveness.

EXHIBIT 4 (B): WYC RANKINGS, 2004

	World Position
The legal framework was	1st
Real personal taxes	1st
Overall, the government policies	1st
The legal regulation of financial institutions	3rd
The institutional framework- the central bank policy	4th
Competitiveness of corporate tax rate on profit at 22%	4th
The stable exchange rate policy	5th
Education in finance	5th
Skilled labour	8th
The availability of financially skilled labour	15th

EXHIBIT FIVE: PEN SKETCH OF LEADING DOMESTIC BANKS (2002)

DBS Group

DBS Bank was established in 1968 as the Development Bank of Singapore to provide financing for the Singapore Government's industrialisation initiatives. In 1998, DBS purchased the government-controlled Post Office Saving Bank (POSB), which was established in 1877 as part of Singapore's Postal Service Department before becoming a statutory board in 1972. The main reason was that the POSB held the major percentage of personal savings (64% of saving market in 1979), loans and mortgage of Singaporeans, while the DBS had focussed on commercial and institutional transactions. As a result of the merger, DBS became the largest local bank as measured by assets totalling S$149 billion as at December 2002 (DBS Annual Report 2002). In its annual report prior its merger in 1997, DBS had 10664 employees, whilst POSB employment was not available- they were thought to be of similar magnitude

DBS acquired substantial stakes in private banks in many countries such as Indonesia, Philippines, Thailand and Hong Kong. It became the fourth largest banking group in Hong Kong with the merger of its wholly owned Dao-Heng Bank and DBS Kwong-On Bank operations. Beyond the anchor markets of Singapore and Hong Kong, it served corporate, institutional and retail customers through its operations in Thailand, Philippines and Indonesia. The bank's credit ratings are amongst the highest in the Asia-Pacific region.

DBS Bank has dominant positions in consumer banking, treasury and markets, securities brokerage, Singapore dollar loans, deposits and equity and debt fund raising with about 87 branches in Singapore, 75 branches in Hong Kong, and 62 branches in Thailand. Strategically, DBS' goal was to use its branches for product promotions and wealth management services and to direct routine service traffic to the call centres and electronic banking facilities. The bank, as reported, seemed to position itself for an increase in demand for e-finance services over the next few years as routine banking and financial transactions would be migrated to electronic facilities to improve the cost dynamics per transaction. However, it might be critical for the Group to maintain personal contact with customers at branches for more value-added services.

UOB Group

UOB was founded in 1935 as the United Chinese Bank to serve Singapore's Fujian community. After opening its first overseas office in Hong Kong, the bank changed its name to United Overseas Bank (UOB). In 1971 and 1972, UOB acquired the Chung Khiaw Bank (an innovative family-oriented bank established in 1956) and Lee Wah Bank respectively. Later, the UOB Group acquired the Industrial Commercial Bank (established in 1953 to finance post-war businesses) and Far Eastern Bank (established in 1958 for resumption of businesses). In order to meet future capital requirements, the UOB Group merged Industrial Commercial Bank with Far Eastern Bank in 1994; and absorbed Lee Wah Bank into the parent UOB.

The Wee family controlled the UOB Group, which eventually grew to become the largest bank in Singapore in terms of number of branches. It had a vast network of 248 offices around the world comprising Singapore bank branches and overseas offices in the Philippines, Malaysia, Thailand, Indonesia, China, Hong Kong, the USA, Taiwan, Australia, Brunei, Canada, France, Japan, Myanmar, South Korea, the UK and Vietnam. In 2001, UOB successfully acquired the fourth largest local bank, the Overseas Union Bank (established in 1947) to create a powerful new force in the local banking industry. In its 2002 annual report, the UOB group employed 12142 people. It had total assets of S$107 billion and a total customer deposit base of more than S$67 billion as at December 2002.

The Group provided a wide range of financial services: commercial and corporate banking, personal financial services, private banking, trust services, treasury, asset management, corporate finance, capital market activities, venture capital management, proprietary investment, general insurance and life insurance, and stock broking services. With the local market offering limited growth prospects, they ventured into Thailand, Malaysia, Indonesia and Philippines for growth. UOB had diversified interests in travel, leasing, property and hotel management, health care, manufacturing and general trading, which the Government mandated disposal of by mid-2004. Earnings from these assets – especially property – had cushioned their bottom line from greater competition and reduced margins in core banking activities over the years. The ability to manage its acquisitions and maintaining its lead in the local market might be critical for its continued strong financial health.

OCBC Group

OCBC Bank was the third largest local bank in Singapore, controlled by Lee family. It was founded in 1932 through the amalgamation of three former banks serving the Fujian community in Singapore – Chinese Commercial Bank Ltd (1912), Ho Hong Bank (1917) and Oversea-Chinese Bank (1919). The early 1970s was a new era in the banking history in Singapore as the Government encouraged foreign banks to set up offices in the new republic. As a result, OCBC bought the Four Seas Communication Bank (established in 1906 to serve the Chaozhou community) and the Bank of Singapore (established in 1954) to prepare for new competitions (Tan, 1999).

In the early 1990s, the government-linked Keppel Group bought the Asian Commercial Bank and renamed it the Keppel Bank. In 1998, it further merged with the Tat Lee Bank (established in 1974) to form Keppel TatLee Bank which was subsequently acquired by the OCBC group. OCBC bank has 8567 employees in 2001 while Tat Lee bank has 1280 employees in 1995, making the OCBC Group at about 10,000 employees. The OCBC group has enlarged its total assets to S$84 billion as at December 2002 after acquiring Keppel TatLee Bank, with more than 125 branches and representative offices in 14 countries, including Malaysia, China, Hong Kong, Japan, Australia, UK and USA. In Asia, it has one of the most extensive networks among regional banks.

OCBC Bank offered a wide range of specialist financial services including consumer, corporate and private banking, global treasury, corporate finance, capital markets, asset management and stock broking services. It had dominant market positions in both the consumer and business banking segments. In Singapore, the Bank had the largest market share in the area of banc assurance, and was among the leading players in unit trust distribution, housing loans, personal credit, the small-and medium-sized enterprises market and the Singapore Dollar capital market. In Malaysia, OCBC Bank was the third largest foreign bank in terms of loans and total assets. The Group revised its strategy to be a 'world-class' financial institution in the Asia Pacific region by focusing on performance and striving for growth. To improve performance, the Group adopted a balanced business approach focused on expanding their customer base, developing innovative products, maintaining sound risk management, investing in employee development and improving their processes for productivity gains. It was the first domestic bank to launch a stand-alone Internet bank under the name 'FinatiQ'. In April 2003, it launched the first online trading account with low brokerage fees. The Group was striving for growth by building a solid platform in Singapore and Malaysia from which it intended to transfer successful product solutions to its network throughout ASEAN and China. OCBC was a strong bank, which weathered the regional crisis rather unscathed but now faces the challenges of sustaining growth in a small and mature economy and might look at acquisitions in Hong Kong and China markets with which it has historical and cultural ties.

THE COMPETITIVE ADVANTAGE OF THE SINGAPOREAN FINANCIAL CLUSTER

As part of a wider survey thirty-three respondents were asked to select the five most important cluster conditions that explained why their firm has chosen Singapore, and then they were then asked to rank them in the order of importance that made the location competitive at a regional and global level. Answers were categorised against eleven conditions particular to financial services industries that had been derived from the literature. Respondents were free to specify any other condition they felt was important even if not included on the list. In this section the results are reported for the group as a whole and for in descending terms of corporate seniority - Director, Senior Manager and junior Manager sub-groups. Their responses are categorised using a modified Importance-Performance Matrix. As well as the factor conditions being present and a competitive situation created and sustained, which is what the Importance-Performance Matrix captures, we could consider how robust and dynamic are linkages within the cluster thus we report some preliminary results using data from the same sample.

THE IMPORTANCE-PERFORMANCE MATRIX

The Importance Performance Matrix seems ideally suited as a technique to represent and analyse the data collected in this paper and it is adapted from the practice of consumer goods companies to assess the importance of various attributes (as perceived by the customer) in comparison to the relative performance of the company on these attributes (Martilla and James, 1977; Nielsen, 1983). This matrix appears ideally suited to assessing national competitive superiority in attracting and maintaining industries. By obtaining the *customers*' (industry players') evaluations of the relative country performance based on the *customers*' judgements of the importance of certain factor conditions, insights may be gathered regarding: (a) the particular consideration of essential factors in promoting and maintaining the financial services industries; and (b) the strength and weaknesses of Singapore.

Diagnostic information regarding the extent and the priority of resource allocation in rectifying weaknesses may be identified as a result. The fundamental assumption of the matrix is that not all attributes will contribute equally to corporate success. If a country performs well in certain conditions considered important, its likelihood of success is enhanced for the industry. On the other hand, poor performance on an important condition may have detrimental consequences for the incumbents in the industry.

A two dimensional approach essentially allows us to obtain a four-cell matrix. Cluster conditions are divided into low / moderate, and, high importance to the financial services industries. Similarly, a country's performance on these conditions can also be divided into excellent versus adequate / poor. Based on the placement of these conditions in the matrix, enhanced understanding of the country's strengths and weaknesses can be obtained. Remedial action can also be undertaken to correct the weaknesses. In our case the Importance Performance Matrix is adapted here to identify cluster conditions necessary for financial services industries and the players' evaluation of their competitiveness in the Singapore context.

Four categories may be delineated and appropriate actions implemented. Where a country is highly competitive on a highly important condition, the strategy for Singapore is one of maintenance (i.e. keeping up the good work). In contrast, where Singapore is only moderately competitive on an important condition, it needs to invest and improve. High competitiveness on moderately / not important condition provides a competitive edge but may be a sign of over-investment. Finally, adequate / poor competitiveness on moderate / non important condition suggests keeping the status quo.

The survey asked respondents to select the five most important cluster conditions from a list of eleven conditions which we have identified for the financial services industries. The respondents were also required to select the five most competitive conditions from the same list. The conditions are: Good local economy and demand for products (F1/C1); Good regional economy and demand for products (F2/C2); Availability of supporting industries (F3/C3); Stable legal and regulatory environment (F4/C4); Good transportation and communication infrastructure (F5/C5); Availability of stable utilities (F6/C6); Availability of good fiscal policies (tax incentives) (F7/C7); Availability of good offices and working environment (F8/C8); Incentives to employ local labour (F9/C9); Availability of skilled personnel (F10/C10); Stable political environment (F11/C11).

The highest percentage of respondents felt that the legal and regulatory framework in Singapore (87%) and a stable political environment (71%) are very important cluster conditions for the financial service industries. In addition, the availability of skilled personnel (61%) and a good local economy and demand (58%) for financial services are also quite important considerations. One respondent added that knowledge and the existing network of financial services are important; while another three respondents felt that the local financial institutions lay an important anchorage for foreign firms in creating an attractive competitive environment.

EXHIBIT SIX: FACTOR-COMPETITIVENESS MATRIX
(IMPORTANCE-PERFORMANCE MATRIX APPLIED TO THE PORTER DIAMOND)

COUNTRY'S COMPETITIVENESS		
Excellent	Over-Investment on unimportant attributes	To maintain lead in competitiveness
Adequate / Poor	Improvements can be made (but low priority)	Invest and improve on important Attributes
	Low	*High*
	IMPORTANCE TO INVESTOR	

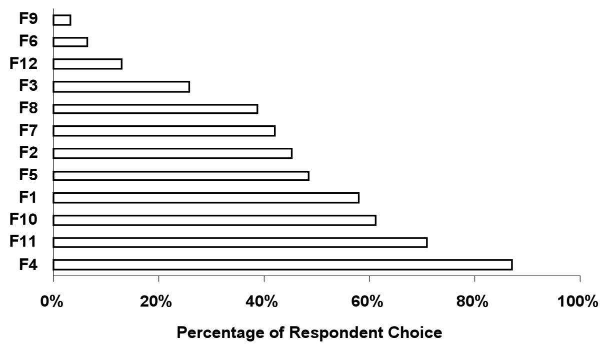
In ranking conditions that are competitive in Singapore, 77% of the respondents chose the legal and regulatory framework and the stable political environment as very competitive for the financial service industries. Exhibit Seven indicates that most respondents agree on which conditions are the most important and competitive conditions.

The pooled results from the 33 respondents indicate that Singapore has supported the financial services industries with the necessary clustering conditions. These are generally in the legal and regulation framework; a stable political environment; abundance of skilled personnel; and a good local market and economy. Based on the pooled results, there seems to be no particular area in which that Singapore needs to invest and improve in order to support this industry. The results indicate that Singapore has correctly identified important conditions and has maintained good conditions for the industry by being quite competitive in the important factors.

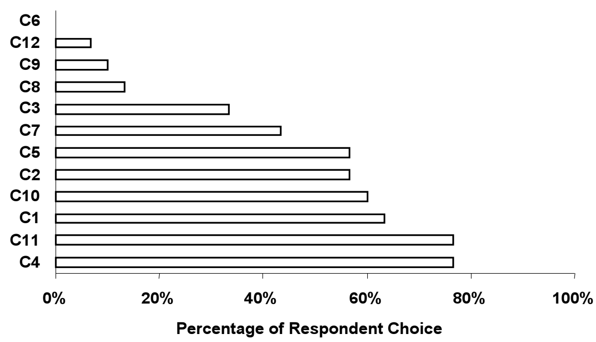
Exhibit Eight reports on the whole sample and the three sub samples. The Director group consists of 6 respondents across four of the eight industries. Although the low number of respondents would make the results less significant, their insights and opinions could potentially be more important as they are mainly decision makers within the companies. This group have identified importance in the country's legal and regulation framework; a stable political environment; and a good regional economy and demand (instead of local demand). Transport and communication infrastructure is quite important and competitive. They also felt that Singapore has a favourable fiscal policy but that was deemed less important to their businesses.

The Senior Manager group is the largest consisting of 20 respondents from seven of the eight industries. They are a group of senior and middle managers with more than 5 years of experience in the financial services industries. This group has identified important conditions being the legal and regulation framework; a stable political environment; abundance of skilled personnel; and a good local market and economy. Like the Director group, they felt that a good regional market and economy is important to financial services industries; so is a good transport and communication infrastructure.

EXHIBIT SEVEN: CHOICE OF FACTORS AND COMPETITIVENESS RANKING BY RESPONDENTS



Importance Cluster Conditions indicated by Respondents

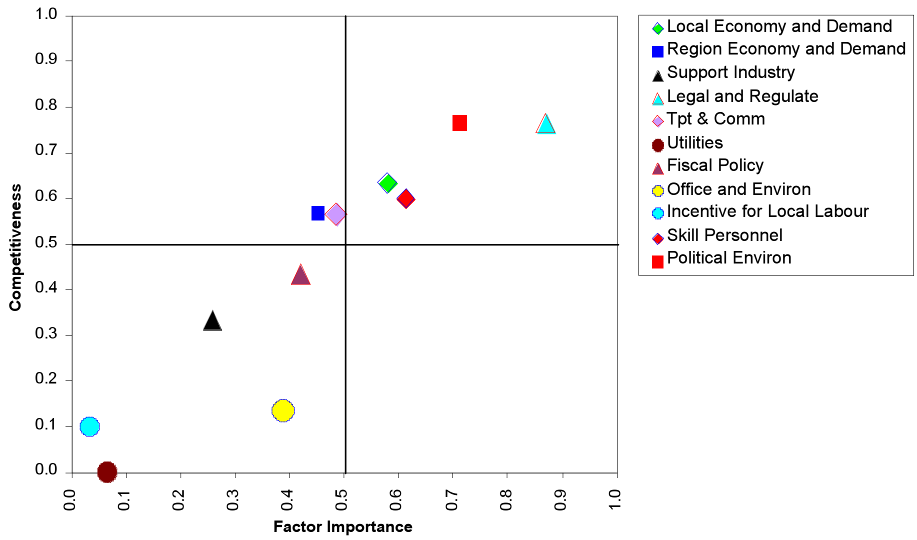


Competitiveness perceived by respondents

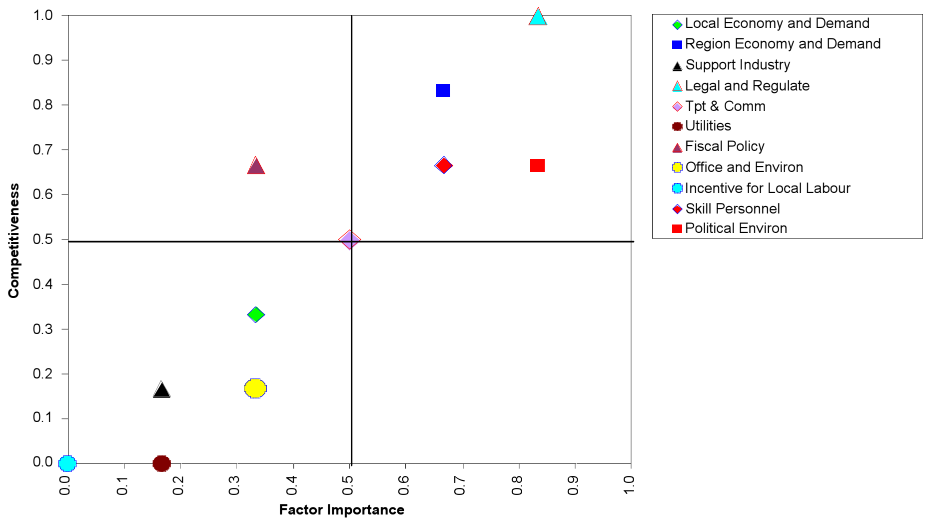
Whilst the Director and Senior Manager groups display rather coherent opinions the Junior Manager group consisting of 7 respondents show a mismatch of opinions. Although this group has identified important cluster conditions being legal and regulation framework; a stable political environment; and a good local market and economy, they felt that Singapore is less competitive in the provision of a good working environment and skilled labour. What is most interesting is that the Junior Manager group has identified that support industries are important as a condition and that Singapore is competitive in this cluster. The presence of supporting industries was initially thought to be quite important to clustering according to some literature, but the other two groups did not identify this as important. This stark result might be due to the limitation of the questionnaire design that only the top five cluster conditions could be selected. The low response rate in this group could also skew the results. However, the Junior Manager group consists of less experienced respondents who are junior managers and executives mainly from the insurance industries and this could represent a lop-sided view.

EXHIBIT EIGHT: FACTOR-COMPETITIVENESS MATRIX. RESULTS

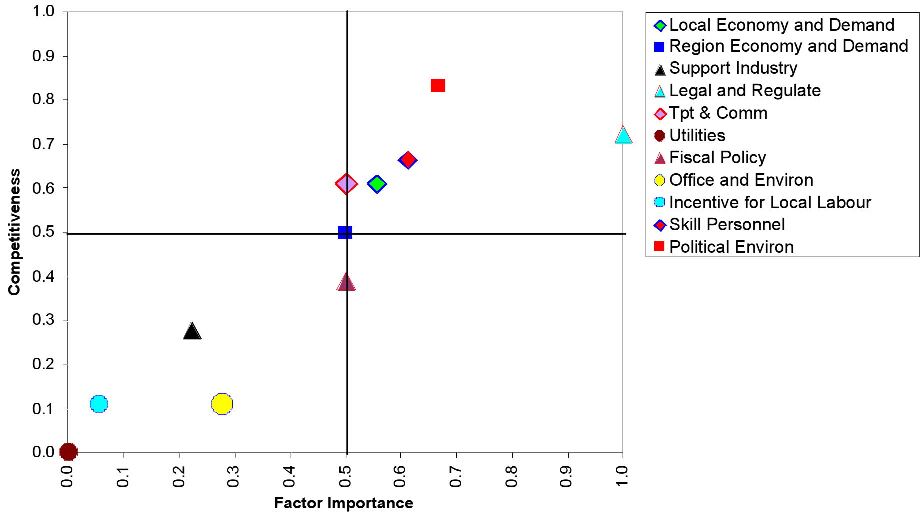
Pooled (all sample) Factor Competitiveness Matrix



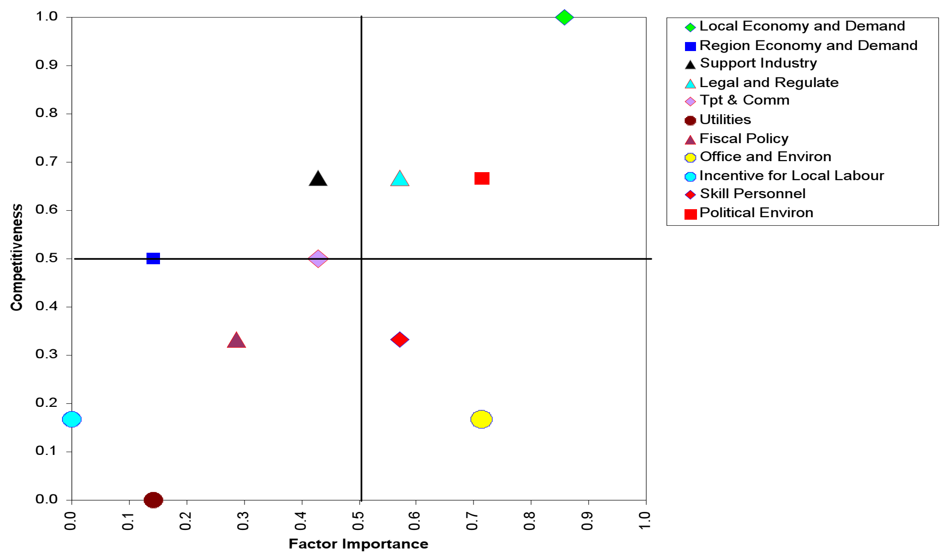
Director's Factor Competitiveness Matrix (below)



Manager's Factor Competitiveness Matrix (below)



Junior Manager's Factor Competitiveness Matrix (below)



CLUSTERING BENEFITS

We also wanted to determine if Singapore's financial centre exhibits some clustering characteristics such as business linkages, innovation, university links and other attributes of Porter's diamond that are reported in the literature. Part of our survey solicited responses on a series of propositions or statements that were derived from the literature. These propositions are assumed true in the first instance. Respondents can basically agree, disagree or express no opinion on a particular statement made. hypotheses are derived as follows. Exhibit Nine below summarises the propositions and our finds. More detail about the methodology can be found in Appendix One.

EXHIBIT NINE: CLUSTER BENEFITS AS PERCEIVED BY THE RESPONDENTS

		Agree	
		Yes	No
H1:	Most of the businesses that we support are located here.		
H2:	It is easier to meet prospective clients and develop new businesses here.		
H3:	It is easier to contact our suppliers if we are located here		
H4:	We find the local supplier base valuable, including a pool of appropriate companies providing key services		
H5:	We can react to our competitors better here as news spreads fast		
H6:	It is easier for customers to find us here.		
H7:	The local labour market provides a pool of labour appropriate to our needs.		
H8:	Key skills appropriate to our business are available in the local labour mark.		
H9:	Local business organisations (like Chamber of Commerce) provide useful links.		
H10:	There is an active and dynamic business environment which enables us to evolve and innovate.		
H11:	Universities and research centre provide a valuable source of new knowledge and information for financial services industries.		
H12:	We are here for historical reasons		
H13:	Our managers and staff like this location		
H14:	It is a useful location to establish our reputation.		

COMMENTS:

(1) Informal communication is plentiful upstream and downstream within the Singapore financial centre. There is also indication to a certain extent of competitive rivalry amongst industry players

(2) Locating in Singapore financial centre lower customer search costs.

(3) There is an active and dynamic environment that allows innovation. This statement, however, cannot measure the extent of innovation, which underpins the future of productivity growth. It only tells us that respondents felt that the environment is dynamic.

(4) This, in fact, is not really a hypothesis on clustering benefits. It attempts to measure whether firms who have been established at the location for a couple of decades have inertia to relocating despite not enjoying benefits of clustering. In other words, this statement is important if other null hypotheses are not rejected. Employees of the financial services industries are indifferent towards this statement. In fact, the demographic of the survey indicate that 67% are foreign firms and hence this statement is quite meaningless to them.

Our survey of the Singapore financial centre indicated that linkages were significant. There was informal communication upstream and downstream in the supply chain. Firms supported other businesses located in the financial centre and they have good links with their suppliers while being located at the financial centre. Firms have also found the local supplier base adequate and useful. The results of the statistical tests also indicated strongly that the Singapore financial centre enjoyed the benefits of clustering. Industry workers felt that it has been easier to meet prospective clients and to develop new businesses when their firm is located in Singapore; and the location was useful in establishing firms' reputation. They also felt that it was easier for potential customers to find them when they are located in Singapore.

The survey revealed that the Singapore financial cluster provided a labour pool appropriate to the needs of the industries. There was no problem attracting and retaining key skills workers, which was abundant in the cluster. Workers generally liked the location, although the specificity was not revealed in the simplified survey.

There was also indication of a certain competitive rivalry amongst industry players. News on competitors' moves spread fast, and there was an active and dynamic environment that allows innovation. However, it was clear that local universities and research centres do not play an important role in providing new knowledge and information for the financial services industries in Singapore. In addition, local business organisations like trade association did not provide useful links for the financial services industries. Singapore does display some signs of the clustering phenomenon, and indeed the vibrant and successful financial centre is attractive to new entrant.

CONCLUSIONS

In this paper we have suggested a novel method of capturing the attitude of a small sample of Singaporean senior and junior managers to the important clustering conditions outlined in the

Porter Diamond. We believe that this method has two broad advantages, namely, that it is simple to operationalise and that it pays proper regard to what is actually happening within the cluster - which is the appropriate unit of analysis. Furthermore we argue that it is possible to have appropriate conditions but for a region not to be to actualise them, so we have placed the Importance Performance Matrix within the context of an appropriate strategic fit between what is offered and what is really sought by companies in the cluster. With regard to another main determinant of cluster viability - that industries do not just co-exist side by side but interact and both give and draw advantage from externalities (spillovers) -we have reported the attitudes of the same sample to fourteen relevant statements that can be found in the literature. The Singaporean financial cluster scores highly on these. Whilst we recognise the limitations of the dataset, we believe that the Importance Performance Matrix in particular has further potential. In our sample it indicates that the different levels of management do not quite share the same view about what is appropriate and valued. Taken alongside the strategic fit approach, then governments not only need to be able to assess what is appropriate and valued but to consider that corporate decision makers are not homogeneous in their views. By extension one could speculate that if managers differ in their views, so will company workers and thus firms need to ensure that their locational decisions provide appropriate conditions and incentives for their workers as well. From a purely academic perspective we have reviewed some of the literature on Porter's Diamond in the context of the literature on clusters and tried to operationalise a difficult and complex concept - a Nation's competitiveness - at a meaningful level of abstraction - the regional cluster.

APPENDIX ONE

A Binomial Test was first used to analyse the number of respondents agreeing and disagreeing to each proposition and rejecting those respondents with no strong opinions. The null hypothesis, in each case was that there is no overall preference between the two categories. A sequence of one sample T-Test was used also to compare against a no-preference null hypothesis. The T-Test is chosen as a secondary measure because some of the propositions have a particularly high number of responses of 'No Opinion'. The integer categories are coded and we assume that the integer responses follow a normal distribution. The Alpha (Cronbach) test was used to test that the pattern of responses from each respondent was consistent and showed internal reliability in the questionnaire design. The value was 0.65.

APPENDIX ONE: CLUSTERING BENEFITS: STATISTICAL DETAIL

Hypothesis	Mean	Variance	Number of Responses	Number who: Agree	Disagree	No opinion	T Statistic	T-Test (One –tail) p-value	Binominal Test p-value
H1	0.636	1.301	33	24	7	2	3.205	0.001529	0.000439
H2	0.909	0.523	33	25	1	7	7.223	0.000000	0.000000
H3	0.576	0.564	33	18	2	13	4.403	0.000056	0.000020
H4	0.545	0.693	33	16	1	16	3.764	0.000339	0.000008
H5	0.788	0.797	33	25	3	5	5.069	0.000008	0.000002
H6	0.697	0.905	33	21	3	9	4.208	0.000097	0.000018
H7	0.970	0.405	33	26	0	7	8.750	0.000000	0.000000
H8	0.939	0.559	33	27	2	4	7.220	0.000000	0.000000
H9	0.030	0.905	33	12	8	13	0.183	**0.427994**	**0.131588**
H10	0.788	0.735	33	21	2	10	5.280	0.000004	0.000003
H11	0.091	0.773	33	11	8	14	0.594	**0.278315**	**0.179642**
H12	0.152	1.320	33	12	10	11	0.758	**0.227130**	**0.261734**
H13	0.636	0.676	33	19	1	13	4.446	0.000049	0.000001
H14	0.848	0.883	33	25	3	5	5.188	0.000006	0.000002

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