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# Singapore Invests in the Nation-Corporation

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A small island-city located at the tip of the Malay peninsula is the site of an astonishing economic and technological achievement. Singapore not only embodies what is already perhaps the most technologically advanced environment in the world but is also poised to become the world's first fully networked society—one in which all homes, schools, businesses, and government agencies will be interconnected in an electronic grid.

Success in that endeavor would go a long way toward ensuring both a continually higher standard of living for Singapore's citizens and the position it needs to prosper in the global marketplace of the future. Singapore's leaders have long believed that their country should make itself extraordinarily convenient for multinational companies to do business with and in. In that, Singapore has succeeded famously. But achieving its avowed objective of becoming a "developed nation" will require an even greater measure of home-grown commerce and technology—and a more open society—than the country has displayed in the past.

Singapore's story demonstrates the capacity of a country with almost no natural resources to create

economic advantages with influence far beyond its region. It represents one scenario for what can happen when a government assumes an instrumental position in shaping and managing the economic environment. And it underscores the importance of identifying and investing in certain key capabilities. The Singaporean government, though widely criticized for its repressive politics, determined that if it invested enormously in technological and human capabilities, it could create an economy where both individuals and organizations would be more likely to flourish.

This strategy holds lessons not only for other small nations but also for large countries and companies of all sizes. Technology management and the effective use of information technology have become the central managerial concerns of our time; Singapore is a significant world presence precisely *because* of its prowess in these two factors.

There are very few inherent advantages that nations and corporations can count on. Advantages have to be created and continuously renewed. In this vein, Singapore has many imitators but few peers.

### Planning for an Information Future

Reduced to its essentials, Singapore's recent economic strategy has been straightforward: it has lever-

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aged its single natural advantage of strategic location by establishing world-class transportation and materials handling facilities; extended such "hubbing" into the financial and other service domains by establishing a sophisticated communications and information technology infrastructure; continuously upgraded the skills of its work force to keep up with the more challenging demands placed upon it; and closely monitored relevant global technological developments, absorbing them as quickly as possible. In manufacturing, historically the island's main attraction to multinationals, Singapore now also encourages companies that want to establish highly sophisticated, automated, and flexible manufacturing centers.

Singapore's information technology strategy has been the centerpiece of its overall economic planning. A comprehensive National Information Technology Plan (NITP) was issued in 1986 by the National Computer Board (NCB), which was established in 1980 to set and implement Singapore's information technology policies. The plan included specific objectives and deadlines for training people; creating an IT culture; enhancing the communications infrastructure; generating and supporting IT applications; fostering a world-class indigenous IT industry that includes software, hardware, and computer services; and pioneering new information technology applications through R&D. In most of these objectives, the National Computer Board has either achieved or surpassed its goals.

The NCB has been largely responsible for ensuring that all the elements of NITP work together. And the elaborately orchestrated crusade has paid off. (See the insert "Singapore's Firsts.") The next phase of Singapore's strategy is aimed at transforming commerce and society on the tiny island nation to create what everybody there now calls an "intelligent island." The government has dubbed this new plan "IT2000." There are no existing models for what Singapore is attempting to do with IT2000. Painted in broad strokes, the objective is to pull disparate functions such as videoconferencing, artificial intelligence, robotics, and networking into a unified whole.

Much of the groundwork for IT2000 is already in place. In 1989, Singapore became the first country to achieve 100% ISDN (integrated services digital network) availability. Compare this with the United States, in which the percentage of phone lines that can provide ISDN service today ranges from 0.1% for Bell Atlantic and Pacific Bell customers to 1.9% for Bell South customers.

Fiber optics deployment and ISDN availability, which the government-run telephone company Sin-

gapore Telecom has set as top priorities at the urging of the NCB, represent the backbone of Singapore's ability to connect all businesses and homes. Singapore Network Services (SNS), a "private," for-profit company set up by the government, already has in place systems such as AutoNet (for manufacturing automation), RealNet (for real estate), LawNet, PortNet, MediNet, BizNet, OrderLink (for purchasing departments), InfoLink (for government, private, and international databases), \$Link (for electronic payments), and SchoolLink (for linking all schools with the Ministry of Education).

Consider, for example, the impact of TradeNet, a project that saves Singaporean traders approximately one billion U.S. dollars a year. Initiated by the government and run by SNS, TradeNet has been an unqualified success in helping to manage Singapore's huge external trade of \$115 billion a year—3.3 times the GNP. International trade has traditionally involved an enormous amount of paperwork. With TradeNet, traders simply fill out one electronic form, which can be submitted by modem to the Trade Development Board's main computer 24 hours a day. Information is then routed, again electronically, to the appropriate government agencies from among the 18 involved in issuing trade documents. Approvals, often generated with the help of expert systems, are deposited in the electronic mailbox of the trader, typically within 15 minutes. Application fees and customs duties are automatically debited from the trader's bank through electronic funds transfers. TradeNet also automatically routes approved permits to the Port and Civil Aviation authorities to facilitate the physical clearance of goods.

Singapore Telecom also offers the most advanced videotext system anywhere. In fact, Televue is the only photovideotext system currently available and the only interactive system that comes close to realizing the multimedia potential of the personal computer. By using broadcast technology for the transmission of high-resolution photographs, Televue is able to bypass one of the major drawbacks of other videotext systems, which must compromise the quality of graphics to increase transmission time or vice versa. Televue also provides sound so that users can hear musical notes or phonetically learn new languages. This feature will prove extremely valuable for the large number of students who struggle with the complicated Mandarin dialect of Chinese, Singapore's second language after English.

Singapore all along has invested heavily in the computerization of its civil service. As a result, its service is the most automated in the world. The time needed to register a private company, for example, has dropped from 50 days to 8, a sole proprietorship

## Singapore's Firsts

Despite its diminutive size (244 square miles, 2.7 million people) and diverse population (77% Chinese, 15% Malay, 7% Indian), Singapore has already achieved a disproportionate number of "firsts."

In the 1991 *World Competitiveness Report* issued jointly by IMD (a non-profit foundation with its headquarters in Lausanne, Switzerland) and the World Economic Forum of Geneva, the overall quality of Singapore's telecommunications infrastructure received a score of 96.67 out of 100, followed by the United States and Japan. In addition, according to Singapore Telecom, 12 out of every 100 Singaporean citizens have pagers, the highest percentage in the world.

The country's work force has been rated by the Business Environment Risk Information service in the United States as the best in the world in each of the last ten years. And its profit opportunity and operations risk ratings only slightly trail those of Switzerland, Japan, and Germany.

Moreover, the worldwide recession has barely caused a ripple here: Singapore's stock market led all others in

the first half of 1991 and the economy was projected to grow a robust 8% for the year.

The country boasts the world's highest savings rate (45%), achieved largely through mandatory contributions to the government-operated Central Provident Fund. The island-city of Singapore also has the busiest and most efficient port in the world, the highest rated airport, the highest proportion of technologists, the most preferred airline (and by far the most profitable), and the lowest telecommunications costs.

In large part, these achievements are the result of governmental vision, a partnership with multinationals, and an orientation toward the future. Singapore's government structure comes into play here, as does the nation's size: a single level of government that manages a relatively small arena presents an opportunity for control and progress not afforded by larger, more diverse systems.

These components, which clearly work well together, may also achieve a larger objective: the evolution of Singapore into what many have started calling a "nation-corporation."

from 30 days to 1. At the airport, passports are checked in 15 seconds (machine-readable passports will soon speed this procedure even further). And admission to government hospitals takes about 1 minute.

Civil service personnel are highly trained. The top 3% of college graduates each year are targeted for intensive recruitment efforts by the civil service, and all government employees receive annual bonuses based on the performance of the Singaporean economy. The projected 6% to 8% growth in 1991 and 1992 will result in a bonus equivalent of up to three months' salary.

Despite its apparently pervasive influence, however, the public sector has been pruned from 8.9% of the work force four years ago to 6% now. These reductions have been achieved through the privatization of government-owned "statutory boards" such as Singapore Airlines, the extensive use of information technology, and constant streamlining to make the government more efficient. Singapore Telecom is the next government-owned company to be privatized.

The networks and their efficient operation are only part of the technological crusade. This year all public phones are supposed to use stored-value phone cards, making coin-operated phones obsolete. And Singa-

pore Telecom recently launched a new service called CT/2, a system that offers a bridge between today's cellular technology and the personal communication networks of the future. PCNs are radio frequency-based telecommunications systems consisting of very small, lightweight handsets. Phone numbers become linked to persons rather than locations.

The phone company and myriad private enterprises on the island are bringing many other new products on-line in Singapore as well. Among them: ISDN-based Group 4 fax machines (high-speed, high-resolution systems that are mostly being used to connect Japanese companies with their corporate headquarters), digital phones, multimedia terminals, and infrared communications devices. And in 1991, Singapore Telecom introduced the world's first public videophone booth. Available for transmitting to ten cities in Japan, the service costs about \$20 for the first five minutes of each outgoing call. The videophone sends and receives full-color, full-motion (if somewhat choppy) video and is quite popular with Japanese expatriates.

An ingenious new Fujitsu product called the "Howdyphone" integrates a telephone with an attached electronic sketchpad. Using ordinary phone lines, the Howdyphone can simultaneously transmit a conversation as well as freehand sketches to an-

other Howdyphone at the other end—thus achieving one of ISDN's promises without requiring an ISDN line or expensive ISDN equipment.

The greater promise of ISDN lies in its availability to individuals at affordable rates. The Information Technology Institute, an applied research arm of the NCB, has developed an ISDN card for personal computers that allows users to bypass much of the expensive equipment otherwise needed for ISDN. It is also close to releasing a PC-based ISDN visual communication system, which will enable a personal computer to operate as a videoconferencing terminal at a much lower cost than stand-alone videoconferencing systems.

The telephone company has spent over one billion dollars in the past five years on capital improvements. It boasts direct undersea cable links, four INTELSAT satellites, two earth stations covering two-thirds of the globe, optical fiber linking all exchanges, packet switching data exchange since 1982, mobile telephones capable of underground use, and radio paging. Singapore Telecom plans to spend another \$1.5 billion in the next five years. Yet its rates range from low (international direct-dial rates are the lowest in the world, about 50% lower than Hong Kong's and 200% lower than Japan's) to almost giveaway: a tone pager costs \$2.50 a month, a pager that displays messages on a screen \$7.50 a month.

However, for all its capital spending and low prices, Singapore Telecom is highly profitable. It generated a net surplus of over \$500 million in fiscal 1989–1990 on revenues of \$1.2 billion. Productivity gains have been dramatic: the ratio of operating income to employee costs has gone up by 51% in five years, and value added per employee has doubled. The company's performance is doubly impressive when one considers its globally competitive rates and that it is owned by the government. Government ownership in most countries is tantamount to bureaucratic and unprofitable operations.

## Leveraging Location

Singapore's only natural assets remain its strategic location and deep-water harbor; it imports the bulk of its food and even its water from Malaysia (characteristically, it sells some treated water back to Malaysia at a profit), and all of its energy comes from oil imported from Brunei and Indonesia. Recognizing this, the Singaporean government has concentrated on developing an infrastructure that more than compensates for the country's lack of natural resources and small size.

The port, for example, handles cargo at more com-

petitive rates than any other international port. Hundreds of shipping lines squeeze their way through Singapore Strait on their way to and from Europe, the Americas, the Middle East, Japan, and Southeast Asia. Most ships stop in Singapore for refueling, repair, and trade, and more than 200 information technology applications have been implemented at the port to streamline such processes. These applications include expert systems for container planning, a system called PortNet for the electronic declaration of vessel calls, electronic data interchange links with other ports for processing arriving ships, and artificial-intelligence-based pattern recognition systems that automatically encode container numbers. So well managed and attractive are Singapore's port services that ships often go days out of their way to use them. As a result, Singapore takes in nearly a billion dollars a year in ship repair and maintenance, a five-fold increase since 1985.

The airport is also a well-oiled operation. Supported in part by the extraordinary worldwide success of Singapore Airlines, Changi Airport is widely acclaimed for its aesthetics and efficiency. Singapore has a special advantage in the symbiotic relationship between its seaport and airport; it can complete sea-to-air shipments in a matter of hours, at a better rate than any other country.

The Singaporean subway, built in the mid-1980s, reflects the government's pragmatic approach to solving problems. The government asked for bids to build the system at a time of global recession, and the subway was completed under budget and two years ahead of schedule. The government reclaimed several large parcels of land from the sea, and used the profits derived from selling leases on the newly formed land to pay for the entire subway system. In one stroke, the island developed an important infrastructural element and expanded prime real estate and the ability to accommodate more overseas investors.

Singapore, even more so than its neighbors such as Thailand, has much to fear from the runaway congestion and pollution that headlong development normally brings. With no room to expand (except into the sea), the prospect of urban gridlock and severe air pollution, Bangkok-style, has caused the government to take steps that would be unthinkable in many countries.

The government first levied duties of approximately 200% on cars to discourage ownership. When this failed to curb new car purchases adequately, the government added a quota system, offering to the highest bidder each month a limited number of "Certificates of Eligibility" for each category of automobile—which has brought in bids as high as \$15,000. A lower priced certificate for "weekend cars" allows

them to be driven only on weekends and after 7:00 P.M. on weekdays; the penalty for driving a weekend car Monday through Friday during the day can run into thousands of dollars. To offset these restrictions, the government keeps taxi fares extremely low. And as a result of such policies, Singapore can claim traffic that flows and a comparatively unpolluted environment.

Singapore's financial system is very sound as well. The government routinely accumulates a budget surplus, though there is no sales tax, no capital gains tax, and the top income tax rate is 31%. By the end of 1990, it had amassed foreign reserves of \$27.5 billion. Singapore has an extensive international banking system, low interest rates (between 4% and 5% for most transactions), no restrictions on the flow of foreign exchange, and a strong currency, which has risen 18% against the U.S. dollar since 1987.

The Singaporean stock exchange is technologically sophisticated though still undercapitalized. The exchange is unusual in that it lacks a trading floor; buy and sell orders are keyed into an advanced computer and communications system and there matched by a system called CLOB (Central Limit Order Book). In January 1990, the month CLOB was installed, turnover on the exchange increased 80%. It now handles greater volumes at lower cost than before and has plenty of spare capacity for future growth.

The exchange will probably play a greater international role in the future, perhaps as a distribution center for ASEAN (Association of Southeast Asian Nations) stocks. Already a number of Malaysian issues have been floated in Singapore, and a direct communications link with the National Association of Securities Dealers' NASDAQ system allows for real-time investment in those stocks.

## Promoting Knowledge Work

In its current drive to add knowledge work, Singapore consistently (and materially with incentives and tax rebates) favors design and development activities over rudimentary manufacturing and automated, overly labor-intensive processes. The Economic Development Board refers companies in search of low-cost labor to neighboring Malaysia or Indonesia; Singapore's own companies have invested more than \$1 billion in Indonesia. The Singaporean government urges the creation of local research and training facilities and attempts to ensure that the island will quickly become self-sustaining in most new technologies, thus easing an excessive dependence on multinationals.

A prime example of this orientation is the GINTIC

Institute of Computer Integrated Manufacturing. Director Ho Nai Choon outlines the Institute's ambitious mission: to propel Singapore into the forefront of integrated, flexible, and intelligent design and manufacturing activities.

Originally established with the assistance of Grumman Corporation of the United States, using offsetting credits from Singapore's purchase of Hawkeye fighter jets, GINTIC is now an independent institute with world-class equipment, facilities, and research programs. For instance, a stereolithography machine from 3D Systems in California is used to produce physical prototypes within hours of a design's completion. The machine is state-of-the-art technology; nonetheless, GINTIC closely monitors development efforts in Israel and by Sony in Japan that may soon provide an advantage over the 3D Systems machine.

The Institute is also pioneering several innovative CAD/CAM applications, such as a new knee-joint prosthesis uniquely suited to Asians (who do a great deal of kneeling and squatting in accordance with traditional customs and rituals), and a computer-aided design and fabrication process for Singapore's rapidly growing jewelry industry. GINTIC has also helped design a new lightweight, diskless laptop computer. The Institute's industrial collaborators span three continents and include Apple Computer, AT&T, Black & Decker, Digital Equipment Corporation, Deutsche Bank, Grumman Data Systems, Hewlett-Packard, IBM, Matsushita, NEC, and Philips.

Singapore has benefited from the growing recognition of how important it is to locate R&D work and manufacturing in close physical proximity. For example, Motorola recently launched in Asia a credit card-sized pager, which was both designed and manufactured in Singapore.

Companies that were attracted to Singapore a generation ago by cheap, pliant labor and a highly solicitous government continue their manufacturing endeavors on the island even as they create and expand research and design centers. Over 650 multinational corporations have manufacturing facilities on the island. Singapore is the disk-drive capital of the world, accounting for over 60% of global production, much of it on fully robotized lines developed in Singapore. The world's largest VCR factory (a joint venture between Thomson SA and Toshiba) is on the island, as is the largest compressor factory (Matsushita's, which recently produced its one-hundred-millionth compressor). Philips's Singapore tuner factory is that company's largest automated facility in the world. Apple Computer's flexible computer assembly lines in Singapore produce one computer every 20 seconds: the company finds it 40% to 50% cheaper to automate manufacturing in Singapore than in the

United States. AT&T's extensive telephone equipment manufacturing in Singapore has earned a reputation within the company and with customers for outstanding quality; returns of its Trimline phones dropped dramatically after Singapore production came on-line. One of AT&T's largest customers, Sears, has twice recognized the Singapore factory for its manufacturing quality.

Singapore now positions itself as a "value-added switching node" and a gateway. The government promotes it as the logical entry point for businesses interested in participating in the region's booming economy and an ideal place to locate a regional manufacturing, sales, and technical-assistance base.

## The Price of Prosperity

The government's well-known ability to influence investment and direct development has been central to Singapore's achievements. The technocratic leaders of Singapore are as likely to quote Michael Porter on the competitive advantage of nations and Kenichi Ohmae on the globalization of economies as they are to espouse Hegelian views on the march of history. However, Singapore has paid a high price for its rapid economic strides. Simply put, the government exercises a degree of power rarely seen in democratic countries and uses it in no uncertain terms.

Singapore's current character has been dominated and shaped by one man—Lee Kuan Yew. Henry Kissinger called him the "smartest man in the Western world"; others have called him arrogant, authoritarian, and puritanical. In 1959, when he came to power, Lee inherited a parliamentary system of government from the British but over the years altered it significantly, in order, some say, to perpetuate his own rule. A believer in democracy—up to a point—Lee said in his most telling quote: "We decide what is right. Never mind what the people think."<sup>1</sup>

The Singaporean government historically has had a low tolerance for dissent. In fact, it has consistently denied its citizens some rather fundamental civil liberties, such as a free press and the right to a speedy trial. The circulations of the *Asian Wall Street Journal* and the *Far Eastern Economic Review* were cut severely after disputes with the government over coverage of various political developments in Singapore. Lee Hsien Loong, Lee Kuan Yew's son and the deputy prime minister—and the man many believe will be Singapore's next prime minister—has said, "We recognize no first amendment right to freedom

of the press. We do not aim to approximate U.S. practice as an ideal."<sup>2</sup>

One government opponent, Chia Thye Poh, was jailed for 23 years under the country's draconian Internal Security Act without ever being tried or formally charged. And other opposition politicians have also been targeted by the government for criminal or tax investigations. The *New York Times Magazine* ran a cover story in 1988 titled "City of Fear," referring not to Beirut or Bucharest but to Singapore.

Citizens of Singapore cannot own satellite dishes, since they are not supposed to receive unauthorized broadcasts. They are also not allowed to bring in unapproved magazines from abroad. The government has repeatedly justified these restrictions for the sake of "maintaining harmony" and preventing the breakdown of societal order.

By and large, however, the people accepted Lee's actions and his government system when he was in power. Singaporeans apparently have been willing to give up a degree of personal freedom in exchange for the government's continued success at increasing their material well-being.

Per capita income (in U.S. dollars) has grown between 15% and 18% for each of the past three years, while inflation has averaged only 2%; its 1990 per capita income of \$12,650 puts Singapore, on paper, behind only Japan in Asia. And some Japanese expatriates in Singapore suggest that the island-city's public amenities, lower prices, and green spaces make for a higher quality of life than in Japan.

Some 87% of Singaporean citizens live in high-rise apartment buildings built by the Housing and Development Board; the majority of people own their units. Singapore has minimal public assistance and no unemployment benefits, yet only 0.3% of its families live in poverty. Moreover, citizens have affordable access to a health-care system that has become a magnet to immigrants in the region.

All of which serves to encourage the citizens' continued approval of their leaders. Most Singaporeans appear apolitical, at least publicly. And despite all of its limitations on the free exchange of information and other curbs on citizens, Singapore remains a democratic society, with open and honest elections.

There are even signs that the government may be ready to relax its repressive policies. For example, it has allowed Dow Jones once again to circulate up to 2,500 copies daily of the *Asian Wall Street Journal* (although 5,000 copies were distributed before the restrictions). The *International Herald Tribune* is still printed in Singapore, and CNN is now broadcast live for two hours a day.

These changes are significant because they fore-

1. Brian Kelly and Mark London, *The Four Little Dragons* (New York: Touchstone/Simon & Schuster, 1990), p. 382.

2. *The Four Little Dragons*, p. 364.

shadow a problem that the Singaporean government will have to address in the near future. Singapore's drive to create an information-enabled, networked society has a built-in irony: there is an inherent conflict between the democratization of information creation and access and the government's long-standing determination to control closely the information its citizens receive.

The revolutions in Eastern Europe and the former Soviet Union—and the near revolution in China—were helped along by the extensive use of various information technologies such as faxes and international computer networks. So, given its past focus on centralized control, why is the Singaporean government in a headlong rush to create what will likely be the world's most fully realized information society? It is hard to imagine that a government known for its planning and attention to the minutest detail has not explicitly considered the possibility that, in a wired information society, centralized control of information flow and exchange will be virtually impossible. One ominous sign is the relative lack of attention given to privacy issues in Singapore's technological crusade. The government's ultimate control over the information society could give it the power to exercise "Big Brother" surveillance over numerous aspects of its citizens' lives.

However, the emigration of substantial numbers of skilled professionals because of Singapore's high-pressure society—and what many have perceived as the government's "idiot child" treatment—has speeded the liberalizing trend now underway. Current prime minister Goh Chok Tong, who was elected in 1990, has brought a more informal, open style to the government, and the sense of released tension after Lee's strict rule is almost palpable. The government has pledged never again to use the Internal Security Act against political opponents. Singapore now may be headed toward a more comfortable balance between its sustained economic miracle and emerging political maturity.

## The Shape of Things to Come

Singapore has become a symbol of economic and technological possibilities for small countries with large ambitions. Malaysia, Taiwan, Turkey, and Cyprus have created their own versions of national information technology plans following Singapore's lead. Other countries have sent delegations to study Singapore's computerization of its civil service. Malaysia's politicians frequently ask their citizens to look south at the tiny island and try to emulate its achievements. They have adopted many of the is-

land-city's farsighted planning and implementation methods; indeed, Malaysia's new economic plan lays down certain Singapore-like objectives for the year 2050.

Singapore is very well armed but dwarfed by its large neighbors; it appears to live with a constant sense of geopolitical insecurity. Its prosperity, like that of Kuwait's, could conceivably prove irresistible to its relatively impoverished neighbors. Unlike Kuwait, however, Singapore's resources are mostly intangible and thus quite perishable. The Singaporean government is now using these resources to create its own version of a "co-prosperity sphere" (Japan's current term for the Asia-Pacific region) to ward off any acquisitive tendencies. Just as Hong Kong has long prospered because of its Chinese hinterland (where 80% of its manufacturing is conducted), Singapore is now attempting to establish areas such as southern Malaysia and portions of the Indonesian archipelago as its own manufacturing hinterland.

An ambitious plan to create a "growth triangle" comprising Singapore, Johor Bahru in Malaysia to the north (connected with Singapore by a causeway, with a second link planned), and the Indonesian Island of Batam to the southwest (30 minutes by ferry) is well underway. By fueling such an undertaking with direct investments and technical assistance, the Singaporean government hopes to catalyze the economic development of its huge neighbors and also reduce any future security threats. The resources of the three complement one another: Singapore provides the technology, telecommunications, and transportation, while Batam and Johor provide much-needed land, low-cost labor, water, and electric power.

The pace of development so far has been startling. Batam was a jungle in January 1990, but today several companies have already commenced operations there, and 35 more have signed up to occupy its fledgling industrial park. Bintan, a second Indonesian island that is twice the size of Singapore, is likely to be added to the plan.

This tiny tail at the southern tip of Malaysia has succeeded in wagging the entire region in search of answers to their developmental challenges. When Singapore was a part of the Malaysian federation, Lee Kuan Yew had visions of it becoming the "New York of Malaysia." Since 1965, what Singapore is in the process of achieving as a sovereign state may transcend even that lofty goal; it is making itself indispensable to any major undertaking in a huge and rapidly growing region.

Given its small size, Singapore must frame most of its aspirations in terms of quality rather than quantity. Although it cannot be the largest in many things, it can still seek to be the most efficient,



## From Trading Outpost to Strategic Hub

Singapore's modern history began in 1819, when Thomas Stamford Raffles, a representative of the British East India Company, established a trading post in the southern part of the Malay Peninsula—a location that had become particularly strategic with the opening of China to foreign trade and the development of shipping routes to Europe around the Cape of Good Hope. With the opening of the Suez Canal in 1869, Singapore—a British colony—became the West's "Gateway to the East," and its importance as a trading hub grew enormously. Singapore continued to prosper into the twentieth century, its population evolving into a mix of maritime voyagers and middle-class traders.

Singapore remained relatively untouched by World War I, but the brutal four-year Japanese occupation during World War II brought an abrupt halt to Singapore's growth and destroyed forever the colonial-era illusion of British invincibility. Most of Singapore's post-war leaders, including Lee Kuan Yew, prime minister from

1959 to 1990, came of age during this traumatic period; the experience shaped their world views and intensified their insecurities about their city-state.

Singapore became a sovereign nation in 1965, following a brief, ill-fated union with Malaysia. At that time, Lee Kuan Yew sought to create an export-led economy and attracted a large number of labor-intensive manufacturing industries. The government gradually shifted investment incentives toward more sophisticated, capital-intensive industries, and by the mid-1970s, Singapore had virtual full employment. Service industries started to become more important, and annual growth rates of close to 10% were the norm.

In the 1980s, the government decided to focus on "brain intensive" industries. This led to the current emphasis on information technology, aerospace technology, pharmaceutical products, and computer-aided manufacturing. The National Computer Board was founded then, and Singapore's on-line development went into high gear.

technologically advanced, and best-managed nation on its own terms. If it cannot be the final destination of goods, it can still be a place to send them on their way. If it cannot absorb much more large industry within its own borders, it can facilitate and help manage industrial operations in a nearby location.

Singapore today can no longer be regarded as merely an astute follower of technological trends

initiated elsewhere. It is very much an innovator in its successful use of information technology across the spectrum of administrative, commercial, and social life. And the "intelligent island" is only now beginning to achieve the critical mass that will allow it to make even more rapid progress in the coming decade. Every trend indicates that by the end of the 1990s Singapore will be a fully enabled information society.