MARKETING STRATEGIES FOR RCL SEMICONDUCTORS LIMITED

by

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In memory of
my dear mother, Madam Chen Jin.

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CHAPTER I

BACKGROUND

Foreword

The electronics boom has brought wealth to quite a few Asian countries. Japan[1] of course is the giant in electronics with a dominant global presence. Electronics exports account for a major part of Japan's trade surplus. A closer look into Japan's success, will indicate that its lead in the high technology[2] electronics business is founded on a well established semiconductor industry.

State of the art semiconductor manufacturing techniques enabled Japan to continually come up with innovative electronic products. Besides, from a production flow point of view, since all modern-day electronics products have semiconductors as their key components, the semiconductor industry is sitting on the top of the product-value-chain. As Japanese semiconductor manufacturers now have a strong position in consumer semiconductors, they have the power to control the profit margins of many Asian electronics producers just by adjusting the prices of many of their sole-source key semiconductor components.

Modelling themselves after Japan, the so called Four Little Dragons of Asia: South Korea, Taiwan, and to a lesser extent Singapore and Hong Kong all have tried their own ways to gain the same success. Today, South Korea, Taiwan, and Singapore,[3] each have their own special areas of strength, and are all highly successful. On the other hand, Hong Kong, due to its unique political and business structures, has

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[1]Paula Doe, "Company Survey: Japan Is Tops in Productivity", *Electronic Business Asia* (Hong Kong), Vol.2 No.11 November, 1991, Cahners Asia Limited, Hong Kong, 1991, p.62.

[2]High technology is original technology and know-how created through fundamental and applied research and development. The research element of R&D is often elusive and requires a "critical mass" of researchers in the field. The high-technology phase is currently in the domain of European, U.S., and Japanese companies. "Study on Hong Kong's Electronics Industry" prepared by *The Hong Kong Productivity Centre for The Industry Department Board*, 1982, An HKPC publication, 1984, p.E.12.

[3]"Study on Hong Kong's Electronics Industry", prepared by *The Hong Kong Productivity Centre for The Industry Department Board*, 1982, An HKPC publication, 1984, pp.147-153.

fallen behind the other three Dragons[1] in high technology development. If present conditions persist, Hong Kong[2] will even trail behind the up and coming "Little Tigers": Thailand[3], Malaysia[4], Indonesia[5] and southern China's Pearl River Delta area[6] in the very near future.

The Modern-day Electronics Industry and the IC Industry

Modern day electronics is synonymous with high-technology, or, "hi-tech". At the heart of hi-tech are semiconductor integrated circuits, which are sometimes called semiconductor chips, semiconductor ICs, semiconductors, or often simply just called chips or ICs (see box 1 on page 3: IC - From Sand to Silicon Valley). These tiny chips are everywhere. Not only are they in personal computers, they are in telephone sets, watches, hi-fi systems, heartbeat pacemakers, automobiles, and, as the Gulf War vividly illustrated, advanced weapon systems. In other words, ICs practically control our lives. No modern-day human beings can live without them.

With their revolutionary invention at the American Telephone and Telegraph's (AT&T) Bell Laboratories in New Jersey, U.S.A., in the late 1950s, ICs rapidly replaced the then widely used vacuum tubes. Compared with the clumsy and unreliable vacuum tubes, ICs are tiny, fast, and reliable. Most importantly, ICs are easily mass producible and therefore very economical. Applications of ICs have accelerated and enabled the waves of miniaturization and automation across the whole spectrum of industries. As a result, nowadays, ICs are the key components for all kinds of

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[1]Ann Marie Angebrandt, "Gloomy Outlook for Hong Kong Exports", *Electronic Business Asia* (Hong Kong), Vol.1 No.7 December, 1990, pp.9-10.

[2]Mark Clifford, "Taking on the titans", *Far Eastern Economic Review*, October 31, 1991, Review Publishing Company Limited, Hong Kong, 1991, p.66.

[3]Rick Boyd-Merritt, "Thailand Wants to Move Up a Level in Electronics", *Electronic World News* (Hong Kong), September 23, 1991, CMP Publications Inc., New York, 1991, p.1, p.34.

[4]William Dennis, "Diversity is Malaysia's Goal", *Electronic World News* (Hong Kong), July 22, 1991, p.1, p.21.

[5]Joel McCormick, "Rumors of a Comeback: Once Fiercely Protectionist, Indonesians are Trying to Undo Yesterday's Mistakes and Get Electronics Going Again", *Electronic Business Asia* (Hong Kong), Vol.3 No.2, February 1992, pp.36-40.

[6]Lewis H. Young, " A Touch of Chinese Austerity Doesn't Show", *Electronic Business Asia* (Hong Kong), Vol.1 No.1, May 1990, p.14.

industrial and consumer products. We can find their presence everywhere -- from the everyday two dollar digital watch to the multimillion dollar state of the art military equipment.

Box 1: IC - From Sand to Silicon Valley

It somehow still seemed like magic how scientists, in 1957, at AT&T's Bell Laboratories, invented semiconductor transistors -- electrical circuits on a semiconductor substrate the size of a pin head. The invention of the transistor quickly led to the start of the semiconductor industry. Young engineers and scientists with an entrepreneurial spirit tried fiercely to commercialize the technology. At the end a very successful industry was formed.

Silicon, a semiconductor, an element which by weight makes up 90% of common sand, a material abundant on Earth, forms the bulk of semiconductor chips. Different fabrication process technologies yield different chips. There are bipolar chips (TTL and ECL), MOS chips (NMOS, PMOS, and CMOS) and BiCMOS chips. Recently, there are also developments in the utilization of different semiconductor materials other than silicon, the more promising one being gallium-arsenide or GaAs. Although there are different end product nomenclatures and starting semiconductor materials, the basic fabrication steps are similar (see figure 1 on page 4: Manufacturing process for NMOS silicon-gate integrated circuits).

From the sixties onwards, the semiconductor industry grew at a record breaking rate. It constantly out-performed all other industries. Especially during the late seventies and early eighties, boosted by the then high flying personal computers and information systems businesses, most semiconductor stocks appreciated five to ten times. The success of the semiconductor business thrust Silicon Valley, a tiny, concentrated area close to San Francisco, where most US semiconductor companies are located, into celebrity status. At times it was even more talked about than the Hollywood of the movie industry 400 miles to the south.

Currently, the worldwide IC market has grown to more than 50 billion U.S. dollars[1]. Despite the present worldwide recession and a cyclical downturn, the IC

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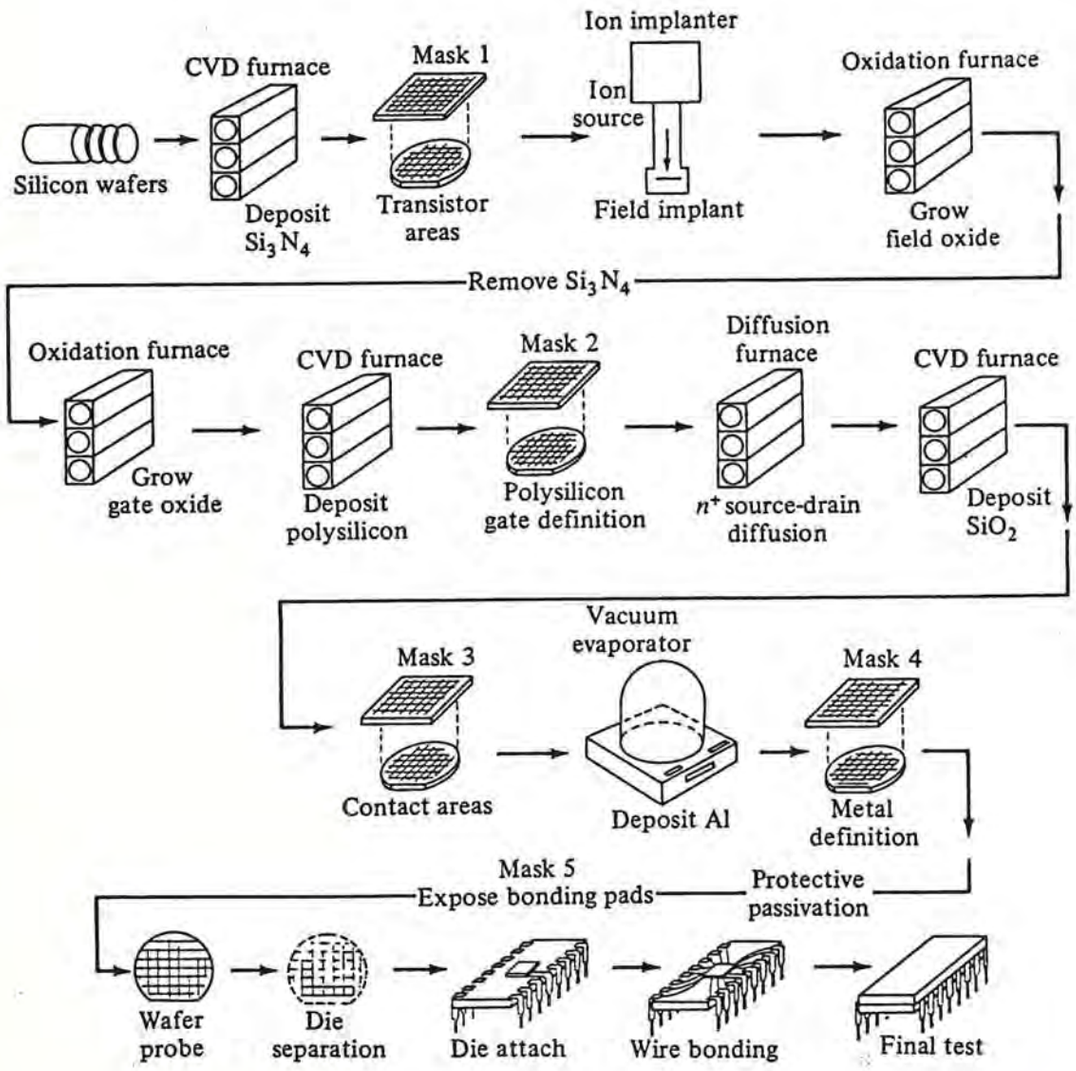
[1]"Regional Focus", *Asian Electronics Engineer* (Hong Kong), March 1991, Asiamag Ltd., Hong Kong, 1991, p.52.

industry is still the fastest growing industry when compared with other major industries. Analysts recently have predicted that, in the long-run, worldwide IC sales will reach 100 billion U.S. dollars in 1995, and cross the 200 billion mark by the year 2000.[1] Besides their tremendous economic impact, ICs also have a very important strategic value, since they are essential components for the most advanced computers and weapon systems. Consequently, an advanced IC industry is considered to be the fundamental building block for all modern day developed countries.

Figure 1: Manufacturing process for NMOS silicon-gate integrated circuits. (*Integrated Circuit Engineering Corporation*)



[1] "Regional Focus", *Asian Electronics Engineer* (Hong Kong), March 1991, p.52.

The Semiconductor IC Industry in Asia

Stimulated by the success of the U.S. semiconductor industry, Japan first followed suit by a highly coordinated government effort. The result has been remarkable. The Japanese first focused on consumer electronics and later, when they gained more expertise, they began targeting the market in other areas. What had happened in the semiconductor memory market is worth noting. After the industrial policy making body MITI (Ministry of International Trade and Industry) made a decision to dominate the semiconductor memory market, the Japanese semiconductor manufacturers began to collaborate with each other under the guidance of the government. They used a systematic, very aggressive, and sometimes questionable marketing tactic to capture the majority share of the worldwide market in a short period. Their basic strategy? Dumping. The Japanese simply out priced other -- most noticeably U.S. -- competitors.

However, just pricing alone could not have made Japan the number one semiconductor supplier on Earth. The meticulous attention the Japanese give to quality assurance is a major contributor to their success. The Japanese semiconductor manufacturers have reputation for both their low cost and high quality products. As the semiconductor manufacturing process is an operation requiring high degree of accuracy and precision, it is a job tailor-made for the highly organized and disciplined Japanese work force. Currently, Japan has already close to 50% of the worldwide 50 billion U.S. dollar semiconductor IC market.[1]

As for the other developing Asian countries, like South Korea, Taiwan, Hong Kong and Singapore, after a period of high economic growth, they have come to the realization that their traditionally labor-intensive manufacturing industries are incapable of sustaining their forward momentum. Influenced by Japan's success in semiconductor manufacturing, they all started moving towards more technology-intensive manufacturing and gradually moved away from labor-intensive manufacturing. South Korea, Taiwan and (at a later date) Singapore all set up structures very similar to the Japanese model. Governments in these countries take a very active role in setting up research and development centers. Local industries can in turn gain relatively cheap access to new technologies. The Hong Kong government, on the other hand, has a different approach.

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[1]Russ Arensman and Ann Marie Angebrandt, "Light at the End of the Tunnel?", *Electronic Business Asia* (Hong Kong), Vol.3 No.1, Jan. 1992, pp.42-47.

Laissez-faire.

And beyond.

To positive non-intervention.

RCL Semiconductors Ltd. and the Scope of the Report

RCL Semiconductors Limited, the company under study, is one of the only three local IC companies in Hong Kong. At the moment, RCL is in trouble. Besides facing an unfavorable investment environment, there is also an unpredictable owner, an agitated management, and an unstable work force. Worst of all, RCL is in a financial limbo. While the management is fighting for day to day working capital, the long time financial backer is actively terminating the capital subsidy life-line. The phenomenon is not limited to RCL. The three (and only three) indigenous IC manufacturers, Hua Ko Electronics Incorporated, Vitelic (Hong Kong) Limited, and RCL, are all struggling for their existence. Strangely enough, based on trade statistics[1], every year, Hong Kong has to import millions of dollars worth of semiconductor ICs for its electronics industry. Therefore, in theory, Hong Kong does have a natural need for local source of IC components. This report attempts to use RCL Semiconductors Ltd. as a case in point. First, to find out the cause for the present perplexing situation and then, to see if there are possible alternative marketing strategies to warrant RCL continuing with its business under this adverse condition.

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[1] *Hong Kong Trade Statistics*, June 1991, Census and Statistics Department, 1991.

CHARPTER II

RELATED LITERATURE

Critique

Periodicals

This research topic was inspired by Drew Wilson's article in *Electronic Business Asia*[1]. In the article, the author painted a very gloomy picture for the Hong Kong semiconductor industry:

> Faced with muscular competition from Taiwan and Korea in the low-end chip market, Hong Kong's three semiconductor manufacturers, Vitelic (HK) Ltd., RCL Semiconductors Ltd. and Hua Ko Electronics Inc., are at a crossroads -- or, one could argue, pinned in place. They can't stay in the low-end market, but they're not capable of competing at the high-end...[2]

The main reason for Hong Kong semiconductor industry's adversity, as argued by the industry experts is the lack of government investment. Francis Ko, assistant general manager for RCL noted in the article that, "without significant government investment, there is no chance of competing with Taiwan and Korea." Vitelic (HK)'s managing director Raymond Wang, agreed and argued that the semiconductor industries in the U.S., Japan and Korea (Taiwan, Singapore, and most ASEAN countries could have been added as well) were not started by the private sector alone, but initiated by government investment. The article through interviews with other industry experts continues to state the need for government involvement in the semiconductor IC industry:

> ...the three firms can't afford to replace aging chip-making equipment, and it is virtually impossible for them to play catch-up with government-assisted regional competitors that are "10 billion dollars and

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[1]Drew Wilson, "It's Do or Die for a Struggling Chip Industry: Low-end Competition and Lack of Capital May Force Semiconductor Makers to Adopt New Strategies." *Electronic Business Asia* (Hong Kong), Vol.2 No.7, July 2, 1991, pp.70-71.

[2]Ibid.

> 10 years ahead," according to Charles Chapman, executive director of the Hong Kong Electronics Association (HKEA).
>
> Effectively, Hong Kong's tiny IC industry has been left in the dust...
>
> ... "(The IC industry) is a capital-intensive, talent intensive business and the Hong Kong Government is not aggressively promoting such a thing," Vitelic's managing director Raymond Wang says.[1]

It appears that the Hong Kong government's positive non-intervention policy (v.s.) is the culprit for the failure of Hong Kong's IC industry. But what then are the future plans for these three IC manufacturers? Interestingly, they all have different views of long term survival strategies. While Vitelic (HK), with its Taiwan and U.S. ties, aims to specialize into a regional test and verification center, RCL Semiconductors is planning for diversification. RCL's assistant general manager Francis Ko thinks, moving out of the low-end, selling complete electronic products, and going global is the solution for RCL. However, the smallest of Hong Kong's chip-makers, Hua Ko Electronics, plans to stick with the low-end track. Hua Ko finds the low-end niche market of making chips for watches, toys and clocks a sustainable strategy. Bill Kahl, vice president of Asia marketing for National Semiconductor Corp. (a top ten world IC semiconductor company[2]), agrees:

> ...(Bill Kahl) says there are still opportunities at the market's low-end. "Look at transistors, which you could say are the earliest form of semiconductors -- they're still used today."
>
> He says Hong Kong's chip companies might do well to concentrate on developing innovative niche products. " Semiconductors and applications are so pervasive that the big companies can't be all things to all people," Kahl says. "The big guys focus on areas with maximum return while the small guys fill small areas. With a niche, it's not too difficult to grow to US$50-$100 million."[3]

Based on Hong Kong's trade figures[4], Hong Kong's annual semiconductor IC trade deficit is close to HK$1 billion. In other words, Hong Kong is highly dependent

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[1]Drew Wilson, "It's Do or Die for a Struggling Chip Industry: Low-end Competition and Lack of Capital May Force Semiconductor Makers to Adopt New Strategies." *Electronic Business Asia* (Hong Kong), Vol.2 No.7, July 2, 1991, pp.70-71.

[2]Elizabeth B. Baatz and Linda Stallmann, "Inside the World's Top 50 Chip Companies", *Electronic Business Asia* (Hong Kong), Vol.2 No.7, July 1991, pp.75-76.

[3]Drew Wilson, "It's Do or Die for a Struggling Chip Industry: Low-end Competition and Lack of Capital May Force Semiconductor Makers to Adopt New Strategies." *Electronic Business Asia* (Hong Kong), July 2, 1991, pp.70-71.

[4]*Hong Kong Trade Statistics*, June, 1991, Census and Statistics Department, 1991.

on imported ICs. However, on the necessity of local IC suppliers, two industry experts, Charles Chapman of HKEA and Bill Kahl of National Semiconductor, differ in their opinions:

> ...Chapman adds that the three firms could take advantage of their small size to do shorter, more customized chip runs. " The Japanese can't do that, they're too big," he says. "You don't go to Toshiba and ask for 20,000 chips."
>
> Chapman points out that the territory is dependent on imported semiconductors, and that a stronger local chip industry would help to regulate semiconductor price fluctuations. Local producers help stabilize the market, he explains, by stepping production up or down according to demand.
>
> But National's Kahl thinks the lack of an indigenous semiconductor industry isn't necessarily a liability. "A lot of countries believe they have to stay ahead in semiconductors to compete in electronics," he says. "That's not true. There's a worldwide overcapacity. A lot of companies are competing and that drives the price margin down. You don't have to strive to be at the leading edge to compete."[1]

The article provided an overview of Hong Kong IC industry. Obviously, the industry is struggling. But one can't help but wonder: if the specific investment environment for IC industry has been so unfavorable, why then were the three IC companies set up in the first place?

Another article by Arensman et al[2] illustrates the different opinions in developing their respective semiconductor industries among the Little Dragons.

For years, Asia had been looking to the West and Japan for technology, but now faced with soaring labor and production costs, and the reluctance of foreign competitors to share their latest technology, Asia is turning to develop its own independent R&D capabilities. In Taiwan, for example, copying foreign designs wasn't just the norm, it seemed the unofficial national policy. It was viewed as the shortcut to help Taiwan companies leapfrog into the ranks of major electronics products. The phenomenon was not limited to Taiwan. Arensman, Brown and Wilson have the following story:

> ...Taiwan wasn't alone in relying on foreign technology. Until quite recently, few Asian electronics makers outside Japan originated

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[1]Drew Wilson, "It's Do or Die for a Struggling Chip Industry: Low-end Competition and Lack of Capital May Force Semiconductor Makers to Adopt New Strategies." *Electronic Business Asia* (Hong Kong), Vol.2 No.7 July 2, 1991, pp.70-71.

[2]Russ Arensman, Geoff Crane, Chris Brown, and Drew Wilson, "Asia Turns On to R&D", *Electronic Business Asia* (Hong Kong), Vol.2 No.12 December 5, 1991, pp.42-52.

> much of the technology used in the products they manufactured. They didn't need to, since the necessary technology could easily be obtained through license agreements, government technology transfer programs, and in many cases outright thievery of foreign designs. Asian companies may not have always offered leading-edge products, but their goods usually sold well anyway because they cost a lot less than the foreign competition.
>
> Growth came easily to electronics makers in Asia's newly industrializing countries during the 1970s and early 1980s, thanks to cheap manufacturing costs and booming worldwide demand. More recently, industry development in the region's Little Dragons - Korea, Taiwan, and Singapore - was sustained by carefully planned national technology strategies.
>
> But in the 1990s even the most successful Asian electronics makers are being squeezed between soaring labor and production costs, and the growing reluctance of foreign competitors to share their latest technology. The combination is already causing problems to many companies in the region and it threatens to halt the industry's rapid growth until more Asian companies learn to develop their own technology.[1]

What is mentioned in the article can be understood as a logical transformation of the high-tech industry. First, the Asian countries jumped into the market with a "We-make-cheaper-copies" strategy, but, as the cost differentials diminished, they are now in a stage in which they must seek to re-integrate and come up with new strategies for the industry. The governments of different Asian countries need to come up with their own national technology development plans. Even more public sector coordination is needed because of the capital and talent intensive nature of the high-tech industry.

> As a result, Ho and other Asian industry leaders are promoting a very different kind of industrial strategy today. "After a certain number of years you have to change - you cannot do business as usual," concedes Ho. "Me-tooism is no longer a viable business practice."[2]

Government initiated R&D activities has become a high priority to catch up in technology:

> Research and development has become a much higher priority for countries in the region. After years of lagging behind the rest of the world in R&D spending, Taiwan, Korea and Singapore are all making major commitments to public-sector R&D programs, as well as creating incentives to encourage more industrial R&D. Examples of that increased commitment can be found in:
>
> * Taiwan, where national R&D spending now equals about 1.3 percent of the country's gross domestic product (GDP). The

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[1]Russ Arensman, Geoff Crane, Chris Brown, and Drew Wilson, "Asia Turns On to R&D", *Electronic Business Asia* (Hong Kong), Vol.2 No.12, December 5, 1991, pp.42-52.

[2]Ibid.

> government wants to raise that level to 2 percent of GDP by 1995 and to 2.5 percent by the year 2000. Officials expect to spend more than US$8 billion on non-military R&D between now and July 1997 under a six-year national R&D plan that calls for 30 percent annual spending increases.
>
> * Korea, which already devotes close to 2 percent of its GDP to R&D. Its government has announced ambitious plans to increase spending to 3.5 percent by 1996 and to 5 percent by the year 2000. (Developed countries like Japan, Germany and the U.S. currently spend just under 3 percent of their GDP on R&D.) A new eight-year plan, dubbed the G-7 Project, should begin next April, aimed at putting Korea's technology level on par with the Group of Seven developed countries by the year 2000.
>
> * Singapore, whose national R&D spending reached 1 percent of its GDP last year. Officials plan to double spending to 2 percent by 1995. As part of that effort, the government recently adopted a comprehensive national technology plan, and is deciding how to spend nearly US$1.2 billion to support industry-driven R&D projects during the next five years.[1]

Noticeably, Hong Kong lacks a commitment to a public-sector technology strategy. Hong Kong has fallen from a regional leader status from a decade ago:

> The same commitment to R&D cannot be found in the fourth Little Dragon, Hong Kong, which was a regional leader a decade ago. While the British colonial government's laissez-faire, pro-business stance has been a boom for some industries, its hands-off policy has proved disastrous for high-tech electronics manufacturing. Although some large electronics firms are still investing in their operations in the colony, Hong Kong lacks the kinds of comprehensive public-sector technology strategy needed to prevent the industry's continued decline.
>
> During the past two years the government has taken some cautious steps to help the industry, including the opening of a Science and Technology University and planning for a new Industry and Technology Development Council (ITDC) to promote strategic technology areas. But most industry observers view those moves as a case of too little, and much too late. A report last year by the U.S.-based Stanford Research Institute, for instance, suggested that an ITDC-like organization should be funded at about 0.5 percent of GDP, which would have required more than six times the U.S.$40 million in annual funds now proposed.[2]

The whole issue may eventually come down to a matter of survival. Besides the Hong Kong government, other officials in the region have expressed a sense of urgency about the need to move quickly to shore up their industries' competitive positions.

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[1]Russ Arensman, Geoff Crane, Chris Brown, and Drew Wilson, "Asia Turns On to R&D", *Electronic Business Asia* (Hong Kong), Vol.2 No.12, December 5, 1991, pp.42-52.

[2]Ibid.

...”We feel that we have to catch up (in R&D),” says Chou Siaw Kiang, executive director of Singapore’s National Science and Technology Board. “If we don’t move fast enough we will see ourselves falling even further behind.”

Chintay Shih, executive vice president of Taiwan’s Industrial Technology Research Institute (ITRI), says his country’s electronics industry has no choice but to increase its R&D efforts. “We’ve reached a new stage in development,” says Shih. “We have to increase manufacturing, design and R&D capabilities, because everything we do from now on is a matter of survival.”

Similar sentiments are echoed in Korea by Sung Ki-soo, president of the government-funded Systems Engineering Research Institute (SERI), an affiliate of the Korea Advanced Institute of Science and Technology (KAIST). “Research and development should receive the same priority and funding as national defense,” says Sung...[1]

Report

Another very significant reference is a report by the Hong Kong Productivity Council (HKPC) in 1982. The report is the summary of the work carried out in a study commissioned to the HKPC by the Industrial Development Board. The recommendations were to be used by the Hong Kong government to strengthen the electronics industry in Hong Kong. The essence of the report can be found in its foreword:

...The existing Hong Kong electronics industry has grown and prospered through a pattern that has evolved over the years. With few exceptions, the industry has been based on offering competitively priced private label goods typically assembled from imported components. The main attribute of the Hong Kong electronics industry is its ability to deliver styling and product changes in time to meet buyer demands in the fad segment of consumer electronic products.

Trends of the electronics industry show a long term reduction in organization size and more recently both a steady decline in the value added content of its products, and a decrease in the number of technical graduates joining the industry. These trends are undesirable for the development of the electronics industry, and they are due to the high concentration of similar production assembly operations resulting in an over competitive supply; and to the lack of investment in the other higher value added and knowledge-intense activities such as marketing, technology development, product and process development, and after sales service. By purely developing as a fast reaction production source for low and medium technology electronic products, the industry now has characteristics of size and structure which make it difficult to reverse trends and to move in the direction of improving the overall value added content. However, based on market and supply considerations, only the

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[1]Russ Arensman, Geoff Crane, Chris Brown, and Drew Wilson, “Asia Turns On to R&D”, *Electronic Business Asia* (Hong Kong), Vol.2 No.12, December 5, 1991, pp.42-52.

electronics industry can offer Hong Kong any substantial prospect for export growth of manufactured goods.

As no worker can for long be paid more than the value he adds to a product without his employer going out of business, value added especially on export activities is the key to raising the standard of living in Hong Kong. In the opinion of HKPC, a new industrial development towards the design, production and marketing of 'technology-intense' products represents a real opportunity and probably now the only feasible direction for increasing the industry's value added. The term 'technology-intense' denotes the application of available high technology in product and is essentially a marketing and development intensive management activity, whereas the creation of high technology is a research and development intensive activity. The value added in a 'technology-intense' business is derived from an entrepreneur's ability to identify opportunities for highly differentiated 'niche' products that fill special needs, and his ability to identify and to integrate the necessary skills and resources to foster and fully exploit an idea in a timely way.

The past history and present pattern of the local electronics industry do not suggest that a technology-intense electronics industry will spontaneously develop in Hong Kong. Presently, there are major structural faults that prevent crossover to the technology-intense phase. The Government of Hong Kong must help to create an environment conducive to the formation of new technology-intense enterprises so that Hong Kong can exploit what are virtually unlimited market opportunities. Electronics is a vast international business with products of unlimited variations; thus the effort of Hong Kong to diversify will not likely be limited by demand constraints but rather by supply factors.

There are four essential ingredients to the success of every technology-intense enterprise. First, people. Second, markets: the existence of markets and their distribution channels, and the capability to identify and exploit these markets. Third, sources of supply of needed parts and components. Fourth, capital: a source of funds sufficient to finance the development, manufacturing and marketing of technology-intense products.

To tackle the major weaknesses existing at present in the four essential ingredients for industrial success, we recommend in this report the establishment of an Electronics Technology Development Laboratory, a Precision Metalworking Institute, a Computer Integrated Manufacturing Institute, the provision of venture capital, and appropriate programmes to improve Hong Kong's marketing capability.

This report is not intended to belittle the considerable achievements of the electronics industry, but rather, it is aimed at making improvements in areas of weaknesses identified. To add a new growth dimension, we believe that Government involvement on a broader front will be needed. Our individual recommendations come together in an overall strategy. If recommendations are pursued partially or in fragmented manner, the prospects for developing a technology-intense electronics industry will be remote.

The output from this study represents the distillation of the results of a substantial programme of work. The conclusions and recommendation are based upon an intensive study of the electronics industry by HKPC and its subcontractor, Arthur D. Little International

> Inc. It is hoped that this report will form a sound basis for the Industrial Development Board to formulate an industry support programme.[1]

The message is quite clear. Hong Kong's electronics industry had been very successful. However, the industry's present mode of providing fast reaction on production of low and medium technology products has come close to its end. As "value-addedness" deteriorates, the only viable way to revive the industry is through "technology-intense" products. This is something imperative to Hong Kong's export-oriented business structure, as, based on market and supply considerations, the electronics industry is the only prospect of growth. The transformation of the electronics industry won't be spontaneous. Since there are structural faults in the industry, as it is noted in the passage, "the Hong Kong government must help to create an environment conducive to the formation of new technology-intense enterprises..." Due to the sheer size of the international electronics market, the limiting factor -- as noted -- is likely to be supply rather than demand.

After the report was published in 1983, the Hong Kong government did considerably change its hands-off attitude. Though no organizations like the aforementioned ETDL, PMI and CIMI (Electronics Technology Development Laboratory, Precision Metalworking Institute, and Computer Integrated Manufacturing Institute) were set up, the government did try to upgrade the necessary infrastructure for high technology development. An ASIC design center[2] was set up within the VTC (Vocational Training Council) for the training of existing engineers. In addition, a controversial new University of Science and Technology of Hong Kong has been established, catering to the education of technical graduates and performing the badly needed central R&D work. However, the pace has been very slow. Many industry experts have expressed their disappointment.[3]

As to the evolution of Hong Kong's electronics industry, the report gave a concise and informative summary:

> The electronics industry of Hong Kong started in 1959 following a decision by Japan to freely export electronic components for radio receivers. This led to the establishment of small local factories

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[1]"Study on Hong Kong Electronics Industry", *Hong Kong Productivity Council*, April 20, 1983.

[2]Robin Agarwal, "A Case of Too Little, Too Late: Government Breaks Hands-off Policy to Fund ASIC Design Center," *Electronic Business Asia* (Hong Kong), Vol.1 No.1, May 5, 1990, p.21.

[3]Tom McHale, "Hong Kong Faces the Future", *Electronic Business Asia* (Hong Kong), Vol.2 No.1, Jan. 1991, p.5.

which operated by assembling transistor radios using components from Japan. At that time, only a few factories were operating and the output of these factories constituted an insignificant part of the economy. The radio receiver industry is the oldest sector of Hong Kong's electronic industry.[1]

(However, the dependency of Hong Kong's electronics industry on Japanese components has remained until now.)

The radio receiver industry expanded rapidly in the 1970s to include other audio equipment items such as cassette tape recorders, and the two items alone accounted for almost all of Hong Kong's output in mature consumer products. In 1981, about 30% of Hong Kong's electronic exports were in mature electronics products and this constitutes the first stream of Hong Kong's electronics industry.

Foreign investments in Hong Kong represent the second stream of the electronics industry. In the early sixties, a few leading American electronics companies, such as Fairchild Semiconductor, Ampex Ferrotec Ltd., and Teledyne Semiconductor, set up manufacturing facilities in Hong Kong to assemble discrete components, e.g. core memory component packages, diodes, transistors and capacitors. At that time, Hong Kong's main attraction to foreign electronic investors was the abundance of low-cost labour, a low tax rate, and a free enterprise system. Furthermore, there were then very few countries in the region who could offer equal attractions to foreign companies.

Foreign investment in the form of subsidiary companies provided an effective means of technological transfer. Factories under foreign management served as a training ground for engineers, middle management and technicians, and many of them later took up various executive and managerial positions in the industry. During the late 60's and 70's, foreign investment dominated the Hong Kong electronics industry, both in terms of employment and output.

The 70's saw a gradual phasing out of core memory systems and a move into packaging and testing of semiconductor memories and other integrated circuits by these foreign subsidiary companies. However, the packaging and testing of semiconductor components peaked in 1980 and was overtaken by the assembly of computer parts, an activity also dominated by foreign subsidiary companies.

The 70's also saw the dominance of foreign subsidiaries give way to the rapid expansion of local participation of electronics manufacturing. The balance was tipped not only by the growth in the radio receiver industry, but also by the emergence of a third stream of the electronics industry.

This third stream of the electronics industry is the fad product stream, and it was fostered by the advent of microelectronics, particular in microprocessors, which created many self-contained and very marketable fad product opportunities. These new business opportunities prompted many small local manufacturers to put parts and components together quickly to form fad products in response to changing market needs. The first boom was created by the mass production of electronic calculators. With the wide application of LEDs and LCDs, the

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[1]"Study on Hong Kong Electronics Industry", *Hong Kong Productivity Council*, April 20, 1983, p.8.

> manufacturing of electronic watches and clocks added momentum to the growth of the industry.
>
> Different kinds of electronic and TV games were then manufactured, and, recently, local companies have been exporting personal computers and peripheral units. Telephones were one of the successful examples of fad products.[1]

(Hong Kong has, since 1982, exported tens of millions units of telephone sets. Electronic organizers and dictionaries are the latest fad products where Hong Kong has a dominant global market share.)

Clearly, Hong Kong's electronics industry has long developed a dependency on foreign, especially Japanese, technology. With limited help from the government, Hong Kong's electronics industry, though, has marginally moved onto more technology intensive manufacturing, but still remained largely reactive to the market. It seems logical that the only way for the Hong Kong electronics industry to have more independence is to have local semiconductor suppliers. However, the report basically thinks Hong Kong cannot afford to have one:

> Technology-intensive activity is the least difficult and probably the only feasible direction of development for Hong Kong... In process fabrication of standard parts and components (ICs), the return on investment is slow. The volume production of standard parts and components is a highly competitive international business, requiring substantial capital and research and development effort. Hong Kong does not possess any comparative advantage for this line of business.
>
> ...(Substantial investment in R&D) is required to create the high technology. This can only be undertaken in very large and advanced economies. At present, it appears that only the United States and Japan are really successful.[2]

Things have changed a lot since 1983. The United States and Japan are not the only countries that can sustain high technology investments. The Europeans now have a leading edge semiconductor IC industry. Regionally, Taiwan and South Korea have both been quite successful in their respective semiconductor businesses. My opinion is that, based on the coverage and weight this report gave to the semiconductor IC portion, the consultant who prepared the report was not very knowledgeable about the industry.

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[1]"Study on Hong Kong Electronics Industry", *Hong Kong Productivity Council*, April 20, 1983, pp.8-9.

[2]"Study on Hong Kong Electronics Industry", *Hong Kong Productivity Council*, April 20, 1983, pp.E11-12.

Thesis

In their 1982 thesis, Tang and Chow basically followed the same critical view of the Hong Kong government. They stated that the Hong Kong government was not doing enough, even though it had provided assistance in terms of low cost land leases at the Taipo Industrial Estate:

> (IC)[1] is the basic ingredient of sophisticated electronic products, without which advancement cannot be made. Japanese semiconductor manufacturers, through government aid, have pioneered (IC) fabrication in (the) Far East and supported their own OEMs (Original Equipment Manufacturers) and have also captured a major portion of the worldwide electronic components market with high success and (have) position(ed) themselves as the major competitors to the U.S.. Countries like South Korea and Taiwan also realize the importance of (ICs) and are developing their own technology. In Taiwan, the Industrial Research Institute (ITRI) operated by the government has a joint venture agreement with RCA at a cost exceeding US$100 million. Korea Semiconductor Incorporated together with the government has licensing and joint venture agreements with US-based semiconductor firms in the transfer of technology
>
> It is reported that one of the three (IC) manufacturers at the Taipo Industrial Estate (will be) in full operation at (the) end of 1981. These three projects are joint ventures between local industrialists and American semiconductor companies. Product emphasis will be on watch CMOS (Complementary Metal Oxide Semiconductor), microprocessors, and memory integrated circuits.The Hong Kong government is not actively involved in these ventures except offering lower cost land at Taipo Industrial Estate to encourage pioneer industries in the colony.
>
> Hong Kong must realize that to diversify its electronics industry is a major undertaking and it can be achieved only through close cooperation and participation between the private sector and government. However, it must be emphasized that the lead and impetus have to come from the government, as no individual organization would have the necessary resources to carry out this job as effectively as the government.[2]

Tang and Chow also advocated the idea of having an indigenous IC technology:

> ...the importance of having (IC) technology firmly rooted in Hong Kong should be emphasized. Presently, local electronic manufacturers depend on imported (ICs) and some imported electronic components. We earn our added value by putting in assembly labor. However, our cost advantage in labor is gradually being surpassed by

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[1]The thesis used the term LSIs (Large Scale Integrated Circuits) instead of the more appropriate term ICs.

[2]Man-lung Tang and Wai-yiu Chow, "A study of (the) Potential Electronics Development in (the) People's Republic of China in (the) Perspective of Hong Kong('s) Electronic Industry", *CUMBA Project Report,* 1982, Library of The Chinese University of Hong Kong, pp.22-25.

> the low labor cost countries and unless Hong Kong has the ability to produce our own (ICs), we cannot have the edge over our competitors.
>
> Furthermore, having local (IC) manufacturing capability, Hong Kong will be less (affected) by the fluctuations of overseas supplies during shortage period.
>
> Microprocessors, CMOS circuits, and memories are the hot items in the IC lines. Hence it is most advantageous for local manufacturers to develop this technology which is a highly capital- and technical-intensive venture, but the long term return on investment will be most rewarding and meaningful to the diversification of our electronics industry...[1]

Tang and Chow were right about the long term deterioration of Hong Kong's ability to add value to its electronic products. They failed to suggest a feasible solution for the enhancement of Hong Kong's IC industry. It sounds almost as if they were pleading for someone to perform "self-sacrifice" and venture into IC manufacturing. Maybe they had the insight that the Hong Kong government would never alter much from its positive non-intervention business policy. But then, who would be altruistic enough in this very capitalistic colony to actually take up the difficult task of investing in a low ROI (return on investment) IC manufacturing business?

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[1]Man-lung Tang and Wai-yiu Chow, "A study of (the) Potential Electronics Development in (the) People's Republic of China in (the) Perspective of Hong Kong('s) Electronic Industry", *CUMBA Project Report,* 1982, Library of The Chinese University of Hong Kong, pp.22-25.

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CHARPTER III

METHODOLOGY

Research Design

This research is largely exploratory and to some extent descriptive. The purpose of this research is to find out the appropriate background information and the possible alternative marketing strategies for RCL Semiconductors. Both primary research and secondary research were conducted. Specifically the author hoped to gain insight to the following:

(1) Why the company was founded
(2) RCL's performance as compared to other companies in the industry
(3) RCL's strengths and weaknesses as a company
(4) RCL's products
(5) RCL's products' strengths and weaknesses compared to other companies
(6) RCL's customers and potential customers for different products
(7) RCL's customers' attitudes regarding different products
(8) RCL's customers' consumption patterns for different products
(9) How RCL's customers make purchasing decisions for different products
(10) RCL's primary market
(11) RCL's market environment
(12) RCL's market size
(13) RCL's market share in its market
(14) RCL's growth potential
(15) RCL's competitive environment
(16) RCL's competitors' strengths and weaknesses
(17) Possible Strategies for RCL

Primary Research

Data collection method

Data were collected by personal interviews via semi-structured questionnaires (Appendices I, II, III). A total of twelve interviews -- six among seniors managers in

RCL, and six among customers and industry experts -- were conducted. For the industry experts category, in addition to a neutral third party expert, a senior manager from each of RCL's local competitors, Hua Ko Electronics Inc. and Vitelic (HK) Ltd were interviewed. The confidentiality of the responses was guaranteed. This method was considered proper as many of the questions are rather sensitive and response flexibility is required. The questionnaire was first pretested by personal interviews with two industrial experts each time until no major revision of the questionnaire was required.

Sampling

Only people with specific knowledge of the field were interviewed. The survey was targeted at:

(1) RCL's middle and senior management
(2) RCL's customers
(3) Senior management of the other IC company - Hua Ko Electronics Inc.
(4) Senior management of the remaining IC company - Vitelic (HK) Ltd.
(5) Other industry experts

For sample groups (3) and (4), since they are RCL's close local competitors, the questions regarding competitive profile were not asked.

Secondary Research

Data collection method

Data collection was facilitated by an extensive literature search. Industrial reports, theses, professional magazines and newspapers were all considered as relevant sources. Additionally, statistical data were obtained from the Hong Kong Census and Statistics Department (see also Chapter II).

Analysis

In the analysis, a marketing systems approach was used. First, profile analyses were conducted for both RCL's internal and external environment. The internal environment variables include RCL's company, and its products and services. The external environment variables include RCL's customers, competitors, and market. In terms of the internal environment variables analyses, attention is paid to the inherent strengths and weaknesses of RCL's company, and its products and services. As for the external environment variables, the analytic criterion varies. For RCL's customers, the

attention is on who the customers and potential customers are, their attitudes towards RCL, their expectations concerning RCL's products and services, and their decision making process. For RCL's competition, the attention is on RCL's competitors' strengths and weaknesses and their possible strategies. Finally, for RCL's market, the attention is on the market's attractiveness both in the short term and in the long term horizon.

CHARPTER IV

FINDINGS

RCL, the Company

Background of RCL

The colonial government of Hong Kong, unlike other governments in the region, was (and has remained) never keen on government intervention in business. They had long established a positive non-intervention approach (v.s.) in Hong Kong. It has often been cited as the major reason for the prosperity in the colony (or the territory[1]). Hence, the Hong Kong government carried this same attitude towards the electronics industry, even though there were highly coordinated efforts from governments around the region to help building up their respective high-tech industries. Nevertheless, the Hong Kong government did give a token contribution to Hong Kong's high-tech development. In 1979, Taipo Industrial Estate in the New Territories was established to encourage the local business community to set up semiconductor ventures.[2] The main attraction was the cheap lease of land for the plants. RCL Semiconductor Ltd., El Cap Semiconductor Ltd. and Hua Ko Electronics Inc. were the only three companies brave enough to take up the challenge.

Founding of RCL

RCL Semiconductors Limited, named after its founder, the late Mr. Richard C. Lee, CBE, JP., was founded in 1979. In his 1981 speech at the inauguration of the new plant, Mr. Lee, RCL's Chairman, touted the opening of the factory and declared that the coming of the microelectronics industry symbolized Hong Kong's entry into a new era of high technology manufacturing. He said that, looking back, Hong Kong

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[1]After the signing of the Sino-British Joint Declaration in 1984, officials of both Hong Kong and China favor the term, "the territory" over the "derogatory" term, "the colony".

[2]Man-lung Tang, and Wai-yiu Chow, "A Study of (The) Potential Electronics Development in (The) People's Republic of China in (The) Perspective of Hong Kong('s) Electronics Industry", *CUMBA Project Report*, 1982, Library of The Chinese University of Hong Kong.

had gained a lot in the seventies as the financial and investment center of the Far East. However, Hong Kong's overall industrial growth had lagged behind its neighboring countries. In his mind, RCL semiconductors Limited would be regarded as a model for high technological development in the industrial sector in Hong Kong.

His vision was well justified. Hong Kong throughout the seventies had gradually shifted from labor-intensive manufacturing towards higher value-added, technology-intensive manufacturing. In the beginning, there were transistor radios and at the turn of the eighties, the electronics industries had blossomed into producers of a great variety of consumer electronics. Despite the apparent transformation, the industry basically remained in the stage of low value added assembly works. Dependence on imported supply of basic components, especially ICs, was believed to be the key factor limiting the industry's ability to compete internationally.

Thus, the paramount goal behind the founding of RCL, as Mr. Lee put it, was to serve the electronics industry of Hong Kong. The company's aspiration was to provide local manufacturers with up-to-date circuits that would suit the ever-changing requirements of their end products. Besides, a local semiconductor supplier would allow manufacturers access to needed components at lower cost.

Mr. Lee, therefore, seemed very dedicated to spearheading high-technology development in Hong Kong.

However, from a purely business point of view, it seems he did not realize the nature of the semiconductor business.

The semiconductor business is very capital-intensive and talent-intensive,[1] and RCL did not have either.

Most of the HK$20 million initial investment was used for land and buildings. RCL had to borrow immediately to fulfill its equipment purchases. A cash flow problem was persistent. RCL had from the start operated in the red. With hindsight, RCL was under-invested right from the beginning. On the human resources side, RCL had to depend on expatriate technical know-how. Overseas consultants were given short term contracts to work for RCL. Local fresh graduates were hired and trained internally. Emphasis was placed on the processing techniques. Not much stress was placed on designs, as it was decided that designs could be copied.

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[1]Drew Wilson, "It's Do or Die for a Struggling Chip Industry", *Electronic Business Asia* (Hong Kong), Vol.2 No.7, July 1991, p.70.

The Chinese Connection

It might have seemed very odd that Mr. Lee, reputedly one of the keenest businessmen in Hong Kong would have taken up such a risky business in his sixties.

Only later did it gradually become known that Mr. Lee had a powerful backer, the government of the People's Republic of China.

China at the time had long wanted to augment its knowledge of semiconductor technology. However, during the seventies and the turn of the eighties, the Western world strictly forbade the licensing of semiconductor technology to the communist countries. They feared the communist countries would used the technology in their weapon systems and could in turn undermine the security of the free world. Western industrial countries set up COCOM (see box COCOM), to regulate the trading of high-technology.

Box 2: COCOM[1]

COCOM, a French acronym for the Paris-based Coordinating Committee for Multilateral Export Controls, was set up in 1949 by the West to make sure strategic technology wasn't shipped to communist bloc countries. If countries are "in" COCOM, they don't have to get clearances to import sophisticated kit. Otherwise, they have to get clearances to import high-end technology, a complicated, time-consuming and sometimes forbidding procedure.

In a desperate move, China turned to its neighbor down south. Hong Kong, being a British colony, was not listed as a "hostile country" to the West. Technology entering Hong Kong, although regulated by COCOM, was rarely refused. Mr. Lee, being a keen businessman, agreed to let the Chinese use RCL as a conduit to gain access to Western semiconductor process technology in exchange for goodwill and financial support. Of course, the whole thing was covert in nature without the knowledge of any western countries and even the Hong Kong government.

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[1]Joel McCormick, "One Country, Two Systems: Colony to Retain Cocom Approval", *Electronic Business Asia* (Hong Kong), Vol.3 No.2, February 1992, p.80.

RCL's Current Status

Because of the Chinese backup, profitability was never a priority for RCL. The situation continued until late 1989. After the June 4th massacre in 1989, Chinese Premier Li Peng carefully studied all Chinese and Chinese-sponsored industries, including joint ventures. Historical losses had pressed China to re-evaluate their investments. By this time, the Chinese had invested a lot in RCL, and had become its majority shareholder. Cumulative losses at RCL had mounted to close to HK$200 million[1] and rising. Faced with criticism and pressure from the central government, MMEI (the Ministry of Machinery and Electronics Industries, the organization which now was responsible for the running of RCL) turned the heat on RCL's management.

From another angle, circumstances had also rendered the role of RCL as a laboratory for the Chinese no longer important. Throughout the eighties, although there were some tense moments between the Sino-U.S. relationship, China's consistent attitude in its open-door policy won more trust from the West. As a result, COCOM had gradually relaxed its control on semiconductor technology exports to China. By 1989, there were already several semiconductor lines running in China.

China has a heavy reliance on foreign IC imports. Rumor has it that although China is a top notch oil exporter, its annual oil revenue does not even compensate for its annual IC imports. The outcome of the Gulf War also delivered a blow to the Chinese government. The Chinese long-held pride in its largest conventional army reserve -- the PLA (Peoples' Liberation Army) -- was shaken: it suddenly realized how vulnerable a conventional military setup is in "hi-tech warfare". Because of the great trade imbalance and national security reasons, China is striving to gain its technology independence in semiconductor ICs. As a result, to invest in semiconductor technology is the major objective for the 8th 5-year plan which started in 1991.

With all the actions within China, RCL can expect even less attention in the near term. Pressed by the adverse situation, RCL's management is frantically scrambling around for new strategies. First, all these years of R&D and cost center attitude have structurally molded RCL into a product driven rather than market driven organization. Second, RCL's perennial under-investment have left RCL technologically five to ten years behind those of its competitors in Japan, South Korea, Taiwan and Singapore.

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[1] *RCL Semiconductors Ltd. Directors' Report and Financial Statements,* 30th June 1990.

RCL's Products

In the beginning, the main line of production at RCL was wafer fabrication of integrated circuits. The primary end product was MOS chips. They had a four inch wafer line which was, in 1981, as good as the technology in the West. As the target market was Hong Kong, consumer electronics like watch chips, voice and melody chips, calculator chips, and some full custom chips were the main products. At the same time, there were always visitors from China "visiting" RCL. The Chinese was using RCL to fabricate their experimental chips. RCL also set up a supplementary LCD (liquid crystal display) line. LCDs were hot items from watch and calculator displays up to large area displays for game and instrument applications.

In 1988, attempting to upgrade its process technology, RCL finally invested in a more advanced second hand five inch single poly-silicon single metal wafer line. With this process line, RCL does have a small technical edge among the three local semiconductor IC houses because the other two semiconductor houses, Hua Ko and Vitelic (HK), are still using the outdated four inch process lines. Last year (1991), RCL's management took decisive measures and sold the losing LCD and ineffective four-inch wafer line to local government organizations in the Guangdong province.

Current RCL is left with four major product lines and their information can best be summarized in table 1 on the next page.

As can be seen, RCL's present product portfolio contains only low-end consumer products. Despite the stable sales, RCL's profitability is plagued by the lack of capacity. According to the management, there is a bottleneck in the manufacturing process that is limiting the overall throughput. The upgrade could cost as much as one million U.S. dollars, and MMEI is unwilling to throw in the money before a positive trend is obvious. RCL's management is facing a "Chicken and Egg" dilemma.

RCL's Customer Profile

Major customers of RCL are locally based. According to the survey, RCL's customers view RCL's products as commodities. Also, RCL's customers are mostly fad and fast reaction product producers geared for the export market. These customers themselves are competing in price with their respective end-products. Therefore, naturally, they look at RCL's products with a cost conscious attitude. Unit price is always a priority if not the foremost priority. Information on RCL's customers is summarized in table 2 on the next page.

Product Line	Applications	Sales	Relative Margin
Melody ICs	Greeting Cards, toys, door bells, telephone buzzers etc.	Stable	High
Timepiece ICs	Digital clocks and watches Digital displays Analog displays (only local supplier)	Stable	Low for digital displays High for analog displays
Voice ICs	Toys	Stable	High
Calculator ICs	Electronic calculators	Stable	Medium

Table 1: RCL's products and their applications

Product Line	Number of customers	Consumption patterns	Price sensitivity
Melody ICs	Many - local	Peak between March to October Small quantities	High
Timepiece ICs	Two - local	Even throughout the year	High for digital displays Low for analog displays
Voice ICs	Many - local	Peak between March to October Small quantities	Medium
Calculator ICs	One - local	Even throughout the year	Medium

Table 2: RCL's products and their customers

Most customers expressed the importance of quality and lead-time. Quite a number of them are disappointed with the service and quality of RCL's products, though most of them indicated that they would order from RCL for shorter delivery time.

Another reason for customers to continue buying RCL's products, as the customer survey indicates , is that they perceive RCL's products to have unique and advanced features which RCL's competitors' lack. Information on RCL's customers' perception of its products is summarized in table 3:

Product Line	Customers' Perception
Melody ICs	Longer melody time
Timepiece ICs	Only local supplier of "analog-display" chips
Voice ICs	Comprehensive library of different "voices"
Calculator ICs	No uniqueness

Table 3: RCL's products and their uniqueness

In another light, the low number of customers and small customer base is due largely to the lack of active marketing from RCL. RCL's management has already committed itself to improvement in this area. As a matter of fact, the present organization re-structuring is targeted at turning RCL into a more market-oriented company.

RCL's Market Profile

Market Conditions for the Semiconductor IC Industry in General

Affected by the present worldwide recession and with no new innovative production on the horizon, the semiconductor IC industry in general is facing slow growth. However, in the longer term, some of the present investments in product designs like HDTV, high performance workstations, and the expansion of

telecommunication markets in underdeveloped countries as well as the newly opened Eastern European countries could produce good growth for the industry.[1]

Market Conditions for the Semiconductor IC Industry in Hong Kong

Since RCL's primary market is Hong Kong, it is very important to focus on some of the local market issues. Traditionally, Hong Kong's electronics exports are heavily dependent on the U.S. market. As there is a prolonged recession in the U.S., the present outlook for the overall electronics manufacturing sector is gloomy. Surprisingly though, the slump has not affected the low-end business much. As a result, RCL's business activities have even shown slight increase in demand. One explanation might be the increase in demand for cheaper toys and gift items during recession times.

At the moment, although all three low-end IC suppliers are running at capacity, Hong Kong is still highly dependent on outside semiconductor IC supplies. The situation could get worst in the longer term because, there are signs that the Japanese have gained even more control over key semiconductor components. Moreover, the need for those components will increase as Hong Kong's electronics exports are expected to increase following the U.S. economic recovery. Basic on various indicators and the experts' views, it will happen as soon as the second half of 1992 and not later than 1993.

The Hong Kong government has acknowledged the need for centralized efforts to coordinate and improve the high-tech environment in Hong Kong. However,the implementation, has been limited by the lack of expertise and very often financial constraints. With the major new airport project coming up, it has become even more unlikely that the government could afford to vigorously help the ailing semiconductor industry.

People with longer term perspectives have started looking at the possibilities of a joint semiconductor effort between China and Hong Kong. Some even mentioned the inclusion of Taiwan. The basic formula is for Hong Kong to contribute in the finance and marketing aspects, China or Taiwan in technology (of course Taiwan is the ideal choice), and China for cheap engineering human resources. There is no question that as

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[1]"Finally, a Bit of Good News in 1991: Midyear Update", *Electronic World News* (Hong Kong), July 8, 1991, p.1, p.33.

1997 approaches, there will be some kind of transformation and re-integration of the local semiconductor industry. General feeling for the greater cooperation between China and Hong Kong in high technology development is positive.

Market Size and Share

Market size and share of RCL's products cannot be determined due to the lack of both external and internal statistics. However, from all indications, the market is very large for RCL. With ever increasing in demand, the long term outlook for low-end semiconductor ICs is good. Industrial experts generally believe the market will be supply side limited for the near term.

RCL's Competition

RCL's Immediate Competitors

RCL's immediate competition comes from the regional (Japan, Taiwan and Korea) and the two local (Hua Ko and Vitelic) semiconductor manufacturers. Information regarding RCL's competitive profile is summarized in table 4 on the next page.

In order to understand RCL's immediate competitors, summary notes were gathered on them. Special attention is paid to the near future movements in their respective semiconductor sectors.

Japan

Japan still has the leading edge technology. The semiconductor industry in Japan is basically integrated vertically into big conglomerates. Japanese semiconductor IC companies have been the most successful in the consumer electronics market segment. While consumer electronics have provided most of the international trade surplus for Japan in the last decade, the current global recession has finally delivered a blow to the Japanese electronics industry,[1] and in turn its semiconductor IC industry.

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[1]Jacob M. Schlesinger, "Japan's Electronics Giants Under Pressure", *Asian Wall Street Journal*, February 24, 1992, Dow Jones & Company, Inc., 1992, p.1, p.20.

Product Line	Competitors	Competitors' strengths	Competitors' weaknesses
Melody ICs	Hua Ko Taiwan	Low cost and low price Good quality	Low quality Higher price Long lead time No credit terms
Timepiece ICs	Japan	High quality Good reputation	High price Long lead time No credit terms Do not sell in small quantities
Voice ICs	Taiwan	Good quality	Higher price Long lead time No credit terms
Calculator ICs	Korea Taiwan	Can fulfill volume orders	Higher price Long lead time No credit terms

Table 4: RCL's products and their competitors

Recent reports have indicated that a lot of the high profit earning electronic giants in Japan have suffered more than 50% drops in profit. Some of them are even reporting their first ever losses in history.[1] The outlook for these Japanese semiconductor IC companies is not good for 1992. They will just have to wait out the recession before they see any significant new growth.

As for their semiconductor IC strategies, the Japanese have long strived to take the technology leadership role. Their ambition is to have a tight control in high-end electronics components including semiconductor ICs. They realize that Japan cannot compete with the Asian developing countries in terms of labor-intensive manufacturing. Their goal is to have a stranglehold on their essential components and skim as much profit as possible in doing so. As they invest more money on high-end R&D and

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[1]Jacob M. Schlesinger, "Japan's Electronics Giants Under Pressure", *Asian Wall Street Journal*, February 24, 1992, p.1, p.20.

expensive semiconductor equipment, chances are that they cannot afford to waste their precious capacity on low-end products like the watch and melody chips and will just source them from the cheaper producers form the neighboring countries.

Korea

Korea's semiconductor IC industry is structured exactly like the Japanese. With well coordinated efforts from the government, the industry has seen exports average over fifty percent growth annually from 1986 to 1988.[1] However, because of huge wage increases at home coupled by the eroding price-competitiveness overseas, the growth of the industry had slowed to only around five percent in 1989. In 1991, the growth even became negative. The need for fundamental change became clear. Now the government is urging more product development and private sector R&D. Moreover, the government has asked semiconductor IC companies to concentrate in different market segments so as to avoid price competition and increase product differentiation. High-end market segments like telecommunication and engineering workstations are their focuses.

The Korean now have a new eight-year plan, dubbed the G-7 Project. The plan (as already noted) has just started in April, and is aimed at putting Korea's technology level on par with the Group of Seven developed countries by the year 2000.[2] Based on this trend, Korea will be out of the low-end semiconductor IC competition soon.

Taiwan

As a latecomer to the international IC competition, Taiwan has done remarkably well. Government initiatives, readily available capital and the innate entrepreneurial spirit of the Chinese people, have created a new industry of almost unparalleled growth.[3] Like Japan and Korea, centralized R&D is performed by the government organization ERSO (Electronic Service and Research Organization), one of about a

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[1]Mark Clifford, "Taking on The Titans", *Far Eastern Economic Review*, October 31, 1991, p.66.

[2]Russ Arensman, Geoff Crane, Chris Brown, and Drew Wilson, "Asia Turns On to R&D", *Electronic Business Asia* (Hong Kong), Vol.2 No.12, December 5, 1991, pp.42-52.

[3]"Unlocking Taiwan's Potential as a World-class IC Manufacturer", *Asian Electronics Engineer* (Hong Kong), Vol.4 No.12, April 1991, pp.56-57.

dozen divisions under ITRI (Industrial Technology Research Institute).[1] But, the semiconductor industry in Taiwan is structurally different from those of Japan and Korea. Most of the IC companies in Taiwan's Hsinchu science park are small to medium size. They were primarily set up by returning Taiwanese Americans who have worked in the U.S.A. semiconductor industries[2]. Like the U.S. counterparts, they are not vertically integrated. There are no complete electronics products manufacturing. ICs are their sole product line.

Because of this kind of structure, the industry is at the mercy of their customers, the OEMs (original equipment manufacturers) and the end product manufacturers. Although Taiwanese semiconductor IC manufacturers have a local market five times their production,[3] there is a severe mismatch between what they produce and what the customer needs. This is a reflection of the lack of marketing efforts. Another negative factor for the industry is the escalating cost. As a result, Taiwan's IC companies, in order to maximize revenue, are cutting low-end products and concentrating on higher revenue products.[4]

Hong Kong

RCL has two local competitors in Hong Kong. They are namely Hua Ko Electronics Inc. and Vitelic (HK) Ltd.

Hua Ko Electronics Inc.

Hua Ko, RCL and El Cap were the three founding semiconductor manufacturers. Back in 1979, they were the three brave enough to set up factories at Taipo Industrial Estate. El Cap later was acquired by Vitelic Corporation -- a U.S. based semiconductor company. It is not a secret anymore that all three semiconductor start-ups were financially sponsored by the government of the People's Republic of China. With El Cap gone to a U.S. company, the Chinese have tightened their control

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[1]Bernard C. Cole, "Inside: Taiwan: a Special Report", *Electronic World News* (Hong Kong), June 17, 1991, pp.30-53.

[2]"Returning Engineers Boost Taiwan's High-end Production", *Asian Electronics Engineer* (Hong Kong), Vol.4 No.12, April 1991, pp.150-151.

[3]Rick Boyd-Merritt, "Taiwan has a Surplus of Entrepreneurs", *Electronic World News* (Hong Kong), June 17, 1991, p.32.

[4]Alan Patterson, "After Tough '90, UMC Focuses on Core Business", *Electronic World News*, June 17, 1991, p.33.

on the remaining two companies. Hua Ko is controlled by the influential China Resources group. Now, the majority of the personnel at Hua Ko are mainland Chinese.

As far as strategy goes, the company is aiming at cost leadership to maintain its low-end position. Hua Ko is the price leader in melody chips and simple-feature digital watch chips. Accordingly, they are the dominant volume supplier and have the majority market share in these segments. The management of Hua Ko is very satisfied at the present strategy. Their longer term goal is to build up enough earnings to upgrade their facilities all at one-shot instead of doing it piecemeal. By then, three to five years later according to the the management, Hua Ko will manufacture some higher-end products.

Vitelic (HK) Ltd.

Vitelic Corporation (a California Corporation) is a U.S. semiconductor design house specialized in computer memory products. It was set up by Taiwanese Americans and financed in a major part by Taiwanese capital. In 1987, after searching for a wafer fabrication plant in Asia for a while, Vitelic Corporation was finally connected with El Cap in Hong Kong. The same year, Vitelic Corporation agreed to purchase El Cap for 10 million U.S. dollars and changed the name to Vitelic (HK) Ltd.

After the purchase, problems within Vitelic (HK) Ltd. started to surface. First, they found out that the Hong Kong government was not nearly as enthusiastic about the semiconductor industry as its counterpart in Taiwan. Second, there was a shortage of qualified engineers to work in this field due to the lack of attention of the Hong Kong tertiary education institutions. Third, Vitelic (HK)'s own financial problems had crippled its plan to drastically upgrade the El Cap facilities. The latest news is that Vitelic (HK) has given up the idea of using the facility for production. Instead, it will be turned into a engineering verification and testing plant.

RCL's Potential Competitors

RCL's potential competitors are China, Singapore and the ASEAN countries.

China (The People's Republic of China)

To be independent in semiconductor technology is the paramount goal for China's Eighth Five-year plan. Ever since Deng Xiaoping's "Open-Door" policy was instigated in the late 1970s, the West had continually relaxed the semiconductor technology embargo imposed on China through COCOM. Despite the glitch in Sino-U.S. relationship after the June 4th Massacre, the trend of relaxation of the COCOM

restrictions did not stop. It seems as if the West is committed to provide China with the needed technology as long as China keeps its "Economic reforms" going.

In the foreseeable future, limited by their technology, capital and market, the Chinese semiconductor manufacturing plants initially will most likely produce low-end IC products. They then will be RCL's potential competitors. However, as the Chinese are still constructing their plants[1], the real threats will be at least two to three years away. Also, by then, there could well be a cooperative relationship between RCL and the Chinese semiconductor industry instead of a competitive one.

Singapore

Singapore until recently concentrated its efforts on positioning itself as the high quality value-added electronic product assembly center in the Far East. Lately, the government, pressed by decreasing margins in this assembly type of manufacturing is aiming at a boosting its semiconductor IC industry.[2] Despite its determination, Singapore is however faced with a severe shortage of qualified engineers.[3] This manpower problem stems from the long term neglect of a semiconductor curriculum in its education infrastructure. In the meantime, Singapore is trying to sustain its effort in setting up its IC industry by scouting for talent overseas. Nonetheless, this is only viable as a short term solution until Singapore gives its educational infrastructure the needed modifications.

ASEAN countries

Malaysia is the most ambitious among the ASEAN countries. However, its ability to get into the semiconductor IC industry is hampered by its lack of local skills. The other up and coming ASEAN countries are Thailand and Indonesia[4]. Based on their present situations, they are not expected to have their own semiconductor IC industry for another five years.

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[1]Rick Boyd-Merritt, "China Makes Trek Back: Two Years After Tiananmen Square, Business is Picking Up", *Electronic World News* (Hong Kong), June 3, 1991, p.1, p.4.

[2]Rick Boyd-Merritt, David Lammers and Bettyann Tinnelly, "Singapore Takes Aim at ICs", *Electronic World News* (Hong Kong), April 22, 1991, p.1, p.33.

[3]Grace Chang, "Chartered Semiconductor: Singapore Chip Firm is Making Its Move: The Government-financed Venture Aims to Create a Domestic Chip Industry from Its Base in ASICs", *Electronic business Asia* (Hong Kong), Vol.2 No.2, February, 1991, pp.36-37.

[4]Joel McCormick, "Indonesia Refocuses its Electronics Strategy", *Electronic Business Asia* (Hong Kong), Vol.3 No.3, March 1992, p.100.

CHARPTER V

SUMMARY AND IMPLICATIONS

Summary

It is helpful to look first at the most important external factor, and that is the attractiveness of the semiconductor IC industry. After this overall assessment, we will have a better perspective of RCL's competitive advantages and opportunities on the one hand and, its constraints and threats on the other hand.

Industry Attractiveness

From an application and usage point of view, the demand for semiconductor ICs, as far as we can see now, has no way to go but up. Some of the present investments in product designs like HDTV, high performance workstations, and the expansion of telecommunication markets in underdeveloped countries as well as the newly opened Eastern European countries could produce good growth for the industry.[1] In more immediate terms, digital applications[2] and wireless communications are likely to be the winners.

In the more specific area where RCL is -- low-end semiconductor IC manufacturing -- the picture is even rosier. The demand for these products remains strong and will stay that way as far as the experts can foresee. At the same time, the competitors are leaving this market because of the razor thin margins and their ever escalating cost. On the other end, because of the prohibitively large initial capital investment acting as a high entry barrier, it is unlikely to see new entrants coming into the market. Taking all these factors into consideration, the low-end semiconductor IC market is in effect a very attractive niche.

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[1]"Finally, a Bit of Good News in 1991: Midyear Update", *Electronic World News* (Hong Kong), July 8, 1991, p.1, p.33.

[2]John Schwartz, "The Next Revolution", *Newsweek*, April 6, 1992, Newsweek, Inc., New York, 1992, pp.52-58.

RCL's Competitive Advantages

RCL does have major competitive advantages in two areas. The first competitive advantage ties in with its close relationship with China, and the second is its slight technological edge over its closest competitor, Hua Ko Electronics Inc.

RCL's "China Card"

As is obvious, one of the Hong Kong semiconductor industry's biggest problems is the lack of support from the government.

However, if we look at this from a longer term perspective then we can see RCL won't have to stick with this government for long.

Five years from now, in 1997, Hong Kong will revert to the sovereignty of China.

At that time, the Chinese government will most probably have a great influence in the industrial policies of Hong Kong. There is a high possibility of a more interconnected China-Hong Kong semiconductor industry. The actual effect is anyone's guess but the consensus of experts is that the change would be for the better rather than for the worse.[1] If that is the case, RCL being, already "in the Chinese camp", would definitely receive very favorable treatment.

Also, because of its close relationship with China, another opportunity for RCL would be its priority to access the potentially huge China market. A market size approximately one-fifth of the world's population in one's back yard would be the dream of any marketer. Most importantly, since China is still relative backward, and the fact that it has an "Open-Door" policy ensuring the continuous improvement in Chinese living standards, the future demand for even basic low-end electronic products will be tremendous.

RCL's technological edge over Hua Ko

RCL's five inch wafer processing line is more advanced than Hua Ko's four inch line wafer processing line. Consequently, RCL can produce more advanced products like the analog display watch chip. At the present moment, RCL is the only

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[1]Lewis H. Young, " A Touch of Chinese Austerity Doesn't Show", *Electronic Business Asia*, (Hong Kong), Vol.1 No.1, May 1990, p.14.

local analog watch chip supplier. In the future, RCL could utilizing its technological edge to produce more differentiated products.

RCL's Constraints

External factors

Investment environment

The most serious external factor that weakens RCL's position in the industry is the adverse investment environment. Compared with other countries, Hong Kong semiconductor industry is facing a relatively difficult investment environment. The major difference is the lack of active government support. Despite the current programs set up by the Hong Kong government to assist the high technology industry, many expert thinks the effort is either too little or too late.[1] With the advent of the new airport project, more assistance from the government is unlikely in the future.

Low-end competition

RCL's immediate survival depends on how well it can compete with its competitors. At the present moment, they are the semiconductor IC manufacturers in Japan, Korea, and Taiwan, in addition to Hua Ko and Vitelic (HK) locally in Hong Kong. With their near future withdrawal from the low-end semiconductor IC market, semiconductor IC manufacturers from Japan, Korea and Taiwan will not be RCL's main concern. In the local arena, Vitelic (HK) has already stated its preferred strategy as being a testing and verification center rather than a production house. This leaves Hua Ko as RCL's major competitor. Hua Ko has a similar product portfolio as RCL's and because of its low operating cost, Hua Ko can undercut RCL's price consistently. Furthermore, Hua Ko has indicated that it will not deviate from this low-end, low-cost strategy for the foreseeable future.

Internal factors

RCL has a lot of internal constraints. They are in almost all of its functional areas. Table 5 on the next page is a summary of all these constraints:

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[1]Robin Agarwal, "A Case of Too Little, Too Late: Government Breaks Hands-off Policy to Fund ASIC Design Center," *Electronic Business Asia* (Hong Kong), May 5, 1990, p.21.

Functional Areas	Constraints
Finance	* Heavily in debt: latest figure is more than 20 million Hong Kong dollars * Majority shareholder (MMEI) refuses to inject new investment capital into RCL * RCL is extremely short of working capital. There are constant problems in meeting its payroll liabilities * No financial means to resolve its production bottleneck because of equipment shortage
Management	* Still have R&D - Cost center mentality * Weak in sales and marketing * Weak in operations control
Operations	* Lack operation procedures * Lack control mechanisms
Products/Services	* Lack outgoing testing * Lack quality assurance

Table 5: RCL's constraints in the functional areas

Implications

With the analyses of the industry attractiveness, and RCL's competitive advantages and constraints, we can proceed to look at the possible short term and long term strategies for RCL.

Short Term Strategies for RCL

Short term overall strategy

Based on RCL's business constraints and competitive advantages, in the short term, a "Loss minimizing" or retrenchment strategy is best suited. If we refer to Kenichi Ohmae's business portfolio matrix (see Appendix IV), we can see that RCL is probably best sited in square "G". The market may be attractive in a general sense, but because of its own weak corporate position, the market looks unattractive for RCL at the moment.

Short term competitive strategy: externally focused

The appropriate choice of RCL's short term competitive strategies is illustrated by Michael E. Porter's generic strategies framework (see Appendix V).

Based on RCL's competitive advantages and constraints as were discussed in the previous chapter, RCL's "Strategic Advantage" should be in the area of, "Uniqueness Perceived by the Customer" and not in the area of, "Low Cost Position". Not having a cost advantage in the low-end market, RCL should exploit its slight technological edge over its closest competitor, Hua Ko. Thus RCL should manufacture products that are perceived to have unique and advanced features (see table 3 on page 31). By emphasizing product differentiation RCL would be able to minimize direct price competition with its competition.

In terms of "Strategic Target", RCL should focus on a "Particular Segment Only" rather than have an "Industry Wide" approach. Having a focal market segment is of vital importance for RCL as it is now very short in resources. This niche marketing approach in the short term can best guarantee a means to return to profitability.

Therefore, the best short term strategy for RCL should be product differentiation with focus on particular segment only as indicated by square "C" in Porter's generic strategies' matrix (see Appendix V).

Short term tactics: internally focused on company's organization

If RCL elects to retrench (loss-minimizing) with emphases on differentiation and focus, then the tactics to effect the aforementioned strategy could be implemented by making corresponding changes in its company functional structure. Table 6 on the next page lists the possible functional strategies for RCL.

Long Term Strategy for RCL

Long term overall strategy

In the long term, RCL should definitely opt for a growth strategy. RCL could fully utilize its close relationship with China to participate in a possible Hong Kong-China semiconductor industry alliance. The basic idea is for RCL to build up its corporate strengths between now and 1997. Hopefully when 1997 arrives, RCL will be, depending on "Market Attractiveness", healthy enough to seek strategic growth in its business (refer to Kenichi Ohmae's business portfolio matrix in Appendix IV).

Functional Areas	Strategy
Finance	* Induce stringent cost control to minimize loss * Downsizing: maintaining minimum personnel overhead hire mainland Chinese to fill suitable positions * Strive to break-even as soon as possible and then requests for more capital investment from MMEI
Management	* Enlarge marketing department * Increase sales and marketing activities
Operations	* Set up detailed operation procedures * Identify present production bottlenecks
Products/Services	* Set up a product planning division * Set up outgoing testing * Set up a quality assurance department

Table 6: RCL's possible short term functional strategies

Long term competitive strategy

Since in the near future, China could take the cost-leadership position in low-end semiconductor ICs, it is wise for RCL to adhere to the differentiation and cost competitive strategy. The possibilities are that RCL could either pass some of the lower-end volume production to the Chinese production lines and concentrate on the high-end and higher margin parts or even gradually phase out its wafer production activities and, concentrate on product development and marketing activities for the Chinese semiconductor IC production lines. This is a proven winning strategy as can be illustrated by the Hong Kong garment and toy industries.

Conclusions

While reputedly having the most successful free market economy in the world, Hong Kong is a very difficult place for semiconductor IC manufacturers.

The Semiconductor IC industry needs active government participation and coordination because it is highly capital and talent intensive[1].

Unlike the other Little Dragons, Hong Kong has a positive non-intervention policy (v.s.).

RCL, Hua Ko and Vitelic, the three (and only three) semiconductor IC manufacturers in Hong Kong are all struggling for their existence because of the lack of private investment capital and a supportive public policy.

Ironically, Hong Kong has a thriving, export oriented electronics industry which import millions of dollars worth of semiconductor ICs each year. Logically, local semiconductor IC manufacturers should have a healthy market and plenty of customers.

Therefore, from a supply vs. demand angle, RCL's problems concentrate more on the supply side rather than the demand side. There are both internal and external constraints limiting RCL's capability and capacity.

Internally, RCL suffers a shortage of badly needed capital investment and the lack of a marketing oriented functional organization.

Externally, RCL has to face competition in the low-end chip market and an unsupportive government policy.

The good news is, on the competitive end, quite a few of RCL's competitors are leaving the low-end chip market and there are no new entrants in sight because of the thin margin and ever escalating cost. Hence, the outlook of the industry is attractive.

Moreover, RCL alone has two major competitive advantages. First, its close relationship with China entitles RCL to preferential access to the huge China market, and more importantly, RCL would benefit from the definitely more "participative" government when Hong Kong reverts to the sovereignty of China five years from now in 1997. Second, RCL's slight technological edge enables it to produce technically more advanced products and to protect itself from its closet competitor Hua Ko.

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[1]Drew Wilson, "It's Do or Die for a Struggling Chip Industry: Low-end Competition and Lack of Capital May Force Semiconductor Makers to Adopt New Strategies." *Electronic Business Asia* (Hong Kong), Vol.2 No.7, July 2, 1991, pp.70-71.

After careful considerations, I have crafted both short term and long term strategies for RCL.

In my opinion, the best short term strategy for RCL is "Loss minimizing", reorganize with a "marketing orientation", and emphases on product differentiation and focus.

In the long term, RCL should pursue growth through a possible Hong Kong-China semiconductor industry alliance. The close relationship with China could prove to be RCL's most valuable asset.

Finally, as the only sure thing in the business environment is CHANGE, it must be understood that the validity of any recommendations for short and long term strategies is a function of time. Successful business organizations should always conduct periodic strategy reviews. Fundamental frameworks such as the ones established by Kenichi Ohmae (see Appendix IV) and Michael Porter (see Appendices V and VI) could be used as bases for continual strategy evaluation and re-evaluation.

Appendix I: Survey Questionnaires for RCL's Management

Appendix I: Survey Questionnaires for RCL's Management

Survey on Opinions towards RCL's future

RCL

Confidential

Dear professionals,

As a highly regarded member of the RCL management team, you are kindly requested to participate in this survey and the result of which will be used in comtemplating future RCL business strategies. Since your opinions carry obvious importance, well thought out responses and a serious attitude are required.

Because of the possible sensitive contents of the survey, a neutral third party is contracted to conduct the survey. All the responses will be filtered and analyzed by the researcher and the results will be published in the form of summary statistics only. Hence, confidentiality is preserved.

Please don't let your voice be unheard!

If your have any questions or comments, please feel free to contact Francis Ko.

Thank you and

Sincerely,

Charles Wong
Research Director

Sept., 1991

Survey on Opinions towards RCL's future

RCL

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BACKGROUND

Official Use

(1) Nature of Job at RCL (check the most appropriate one)

__ Accounting
__ Engineering
__ Finance
__ Manufacturing
__ Personnel & Aministration
__ Sales/Marketing
__ Board of Directors
__ Other (please specify) _____

(2) Years at RCL ____

(3a) How would you describe you know most about RCL?

_____
_____

(3b) How would you describe you know least about RCL?

_____
_____

COMPANY PROFILE

(4) Your understanding of why the company was founded:

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Survey on Opinions towards RCL's future

RCL

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COMPANY PROFILE

(5) Your understanding of how the company was founded:

(6) Compare to other companies in this industry, how do you find RCL's performance:

__ best
__ better than most
__ about the same
__ not as good as most

(7a) RCL's strengths as a company:

(7b) RCL's weaknesses as a company:

Survey on Opinions towards RCL's future

RCL

Confidential

PRODUCT PROFILE

(8) **What are the kind of products RCL is making?**

(9a) **RCL's products strengths compared with other companies':**

(9b) **RCL's products weaknesses compared with other companies':**

Survey on Opinions towards RCL's future

RCL

Confidential

MARKET PROFILE

(10) What do you think are the company's primary markets (for different products)?

(11) How do you discribe the market environment (for different products)?

(12) What are the market trends (for different products)?

(13) What do you think the market size is - TAM (for different products)?

(14) What do you think RCL's market share is - SOM in these markets (for different products)?

(15) What do you think RCL's growth potential is in these markets (for different products)?

Survey on Opinions towards RCL's future

RCL

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CUSTOMER PROFILE

(16) **Who do you think are the customers/potential customers (for different products)?**

major/minor - split

(17) **What do you think are the customers' attitudes (for different products)?**

like/don't like
uasage?

(18) **What do you think are the customers' consumption patterns (for different products)?**

price
vs. value added

commodities
vs. solution

(19) **How do you think the customers make decisions (for different products)?**

Survey on Opinions towards RCL's future

RCL

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COMPETITIVE PROFILE

(20) What do you think is the competitive environment (for different products)?

major/minor - split

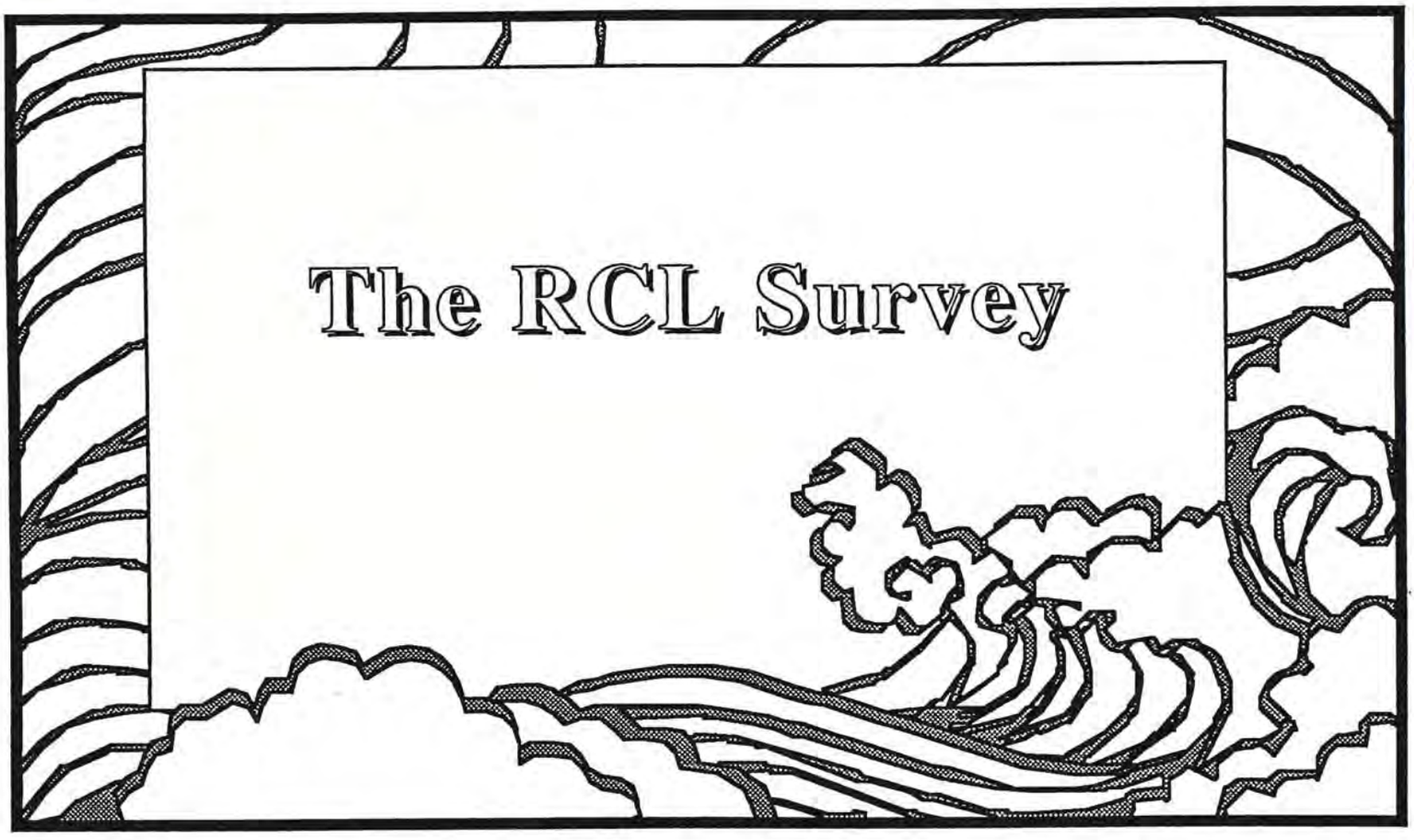
(21) What do you think are the strengths and weaknesses of competitors (for different products)?

(22) What do you think are the strengths and weaknesses of competitors (organization)?

(23) What do you think are the strengths and weaknesses of competitors (marketing capabilities)?

Anything else?

Appendix I: Survey Questionnaires for RCL's Management



Appendix II: Survey Questionnaires for RCL's Customers

Appendix II: Survey Questionnaires for RCL's Customers

Survey on Opinions towards RCL's future

RCL

Confidential

Dear professionals,

As a customer of RCL, you are kindly requested to participate in this survey and the result of which will be used in a report concerning the future of RCL and the industry. Since your opinions carry obvious importance, well thought out responses and a serious attitude are required.

Because of the possible sensitive contents of the survey, all the responses will be filtered and analyzed by the researcher and results will be published in the form of summary statistics only. Hence, confidentiality is preserved.

Please contribute your opinions!

If your have any questions or comments, please feel free to contact me at anytime.

Thank you and

Sincerely,

Charles Wong
Research Director

Dec., 1991

Appendix II: Survey Questionnaires for RCL's Customers

Survey on Opinions towards RCL's future

RCL

Confidential

CUSTOMER'S BACKGROUND

Official Use

(1) Area of responsibilty (check the most appropriate one)

__ Accounting
__ Engineering
__ Finance
__ Manufacturing
__ Personnel & Aministration
__ Sales/Marketing
__ Board of Directors
__ Other (please specify) _____

(2) Years in business ____

(3a) How would you describe you know most about RCL?

_____
_____

(3b) How would you describe you know least about RCL?

_____
_____

CUSTOMER'S COMPANY

(4) Could you give me a general description of your company:

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Survey on Opinions towards RCL's future

RCL

Confidential

RCL - COMPANY

(5) Your understanding of how the RCL was founded:

(6) Compare to other companies in this industry, you find RCL's performance:

__ best
__ better than most
__ about the same
__ not as good as most

(7a) RCL's strengths as a company:

(7b) RCL's weaknesses as a company:

Survey on Opinions towards RCL's future

RCL

Confidential

RCL - PRODUCT

(8) **Your understanding the kinds of products RCL is making.**

(9) **Which RCL products are you most interested in? Least interested in?**

(10) **Are you buying from or planning to buy from RCL? When? Why?**

(9a) **What do you like to most about RCL's products:**

(9b) **What do you like the least about RCL's products:**

Survey on Opinions towards RCL's future

RCL

Confidential

CUSTOMER'S MARKET

(10) **What is your company's primary markets (for different products)?**

(11) **How do you discribe the market environment (for different products)?**

(12) **What are the market trends (for different products)?**

(13) **What do you think the market size is - TAM (for different products)?**

(14) **What do you think your company's market share is - SOM in these markets (for different products)?**

(15) **What do you think your company's growth potential is in these markets (for different products)?**

Appendix II: Survey Questionnaires for RCL's Customers

Survey on Opinions towards RCL's future

RCL

Confidential

RCL'S COMPETITORS

(20) What do you think is the competitive environment for RCL (for different products)?

major/minor - split

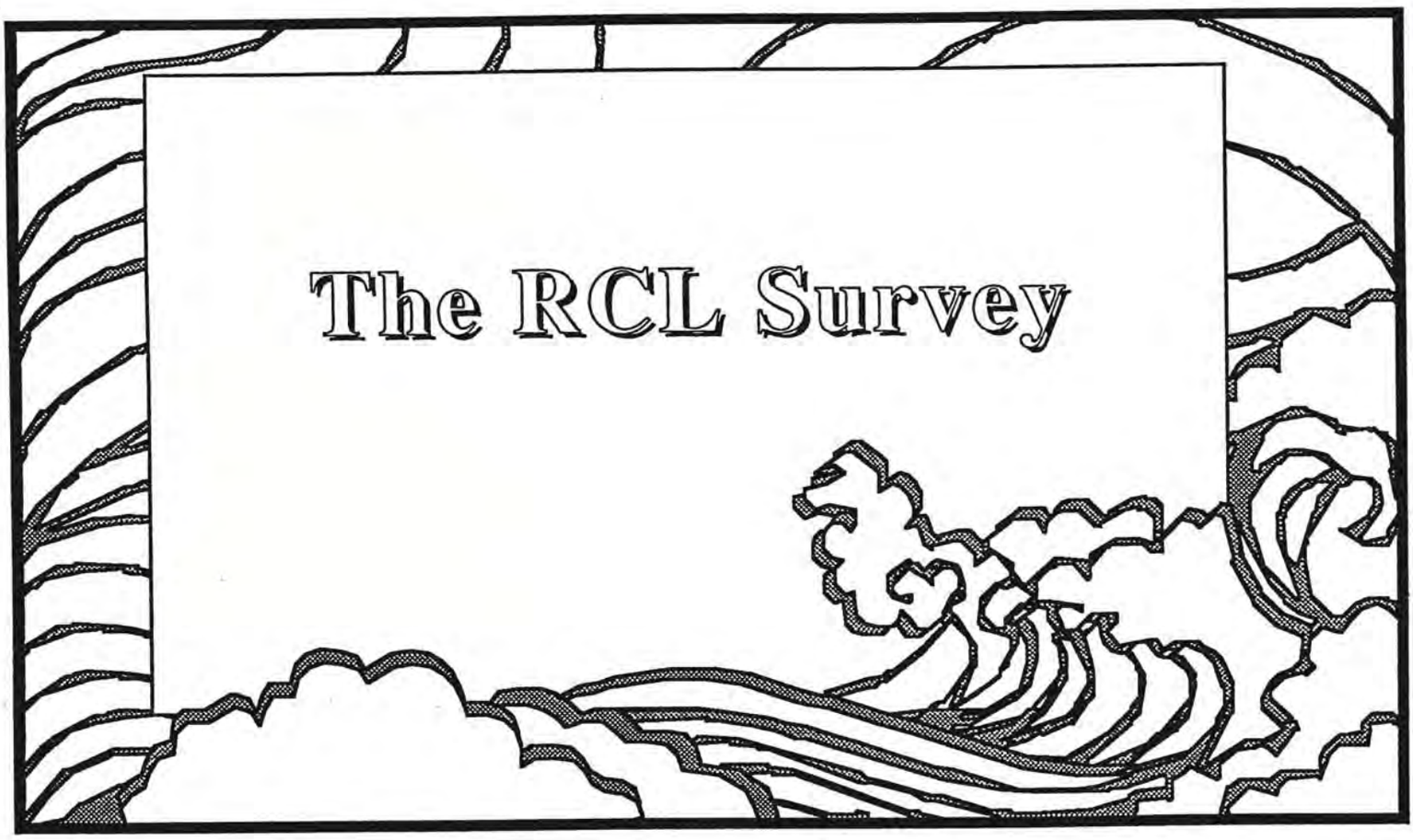
(21) What do you think are the strengths and weaknesses of RCL's competitors (products/services)?

(22) What do you think are the strengths and weaknesses of RCL's competitors (company/organizations)?

(23) What do you think are the strengths and weaknesses of RCL's competitors (marketing capabilities)?

Anything else?

Appendix II: Survey Questionnaires for RCL's Customers



Appendix III: Survey Questionnaires for Semiconductor Industry Experts

Survey on Opinions towards RCL's future

RCL

Confidential

Dear professionals,

As a highly regarded member of the semiconductor IC industry, you are kindly requested to participate in this survey and the result of which will be used in a report concerning the future of RCL and the industry. Since your opinions carry obvious importance, well thought out responses and a serious attitude are required.

Because of the possible sensitive contents of the survey, all the responses will be filtered and analyzed by the researcher and results will be published in the form of summary statistics only. Hence, confidentiality is preserved.

Your expert opinion is appreciated!

If your have any questions or comments, please feel free to contact me at anytime.

Thank you and

Sincerely,

Charles Wong
Research Director

Nov., 1991

Survey on Opinions towards RCL's future

RCL

Confidential

EXPERT'S BACKGROUND

Official Use

(1) Functional responsibilty (check the most appropriate one)

__ Accounting
__ Engineering
__ Finance
__ Manufacturing
__ Personnel & Aministration
__ Sales/Marketing
__ Board of Directors
__ Other (please specify) _____

(2) Years at in the industry ____

(3a) How would you describe you know most about RCL?

_____
_____

(3b) How would you describe you know least about RCL?

_____
_____

EXPERT'S COMPANY PROFILE

(4) How would you describe the line of business of your company?

_____
_____
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RCL - COMPANY

(5) Your understanding of how the company was founded:

(6) Compare to other companies in this industry, how do you find RCL's performance:

__ best
__ better than most
__ about the same
__ not as good as most

(7a) RCL's strengths as a company:

(7b) RCL's weaknesses as a company:

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RCL - PRODUCT

(8) **Your understanding the kind of products RCL is making.**

(9a) **RCL's products strengths compared with other companies':**

(9b) **RCL's products weaknesses compared with other companies':**

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RCL - MARKET

(10) **Your understanding of the company's primary markets (for different products)?**

(11) **How do you discribe the market environment (for different products)?**

(12) **What are the market trends (for different products)?**

(13) **What do you think the market size is - TAM (for different products)?**

(14) **What do you think RCL's market share is - SOM in these markets (for different products)?**

(15) **What do you think RCL's growth potential is in these markets (for different products)?**

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RCL - CUSTOMERS

(16) Who do you think are RCL's customers/potential customers (for different products)?

major/minor - split

(17) What do you think are these customers' attitudes (for different products)?

like/don't like
uasage?

(18) What do you think are these customers' consumption patterns (for different products)?

price
vs. value added

commodities
vs. solution

(19) How do you think these customers make decisions (for different products)?

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RCL - COMPETITORS

(20) What do you think is RCL's competitive environment (for different products)?

major/minor - split

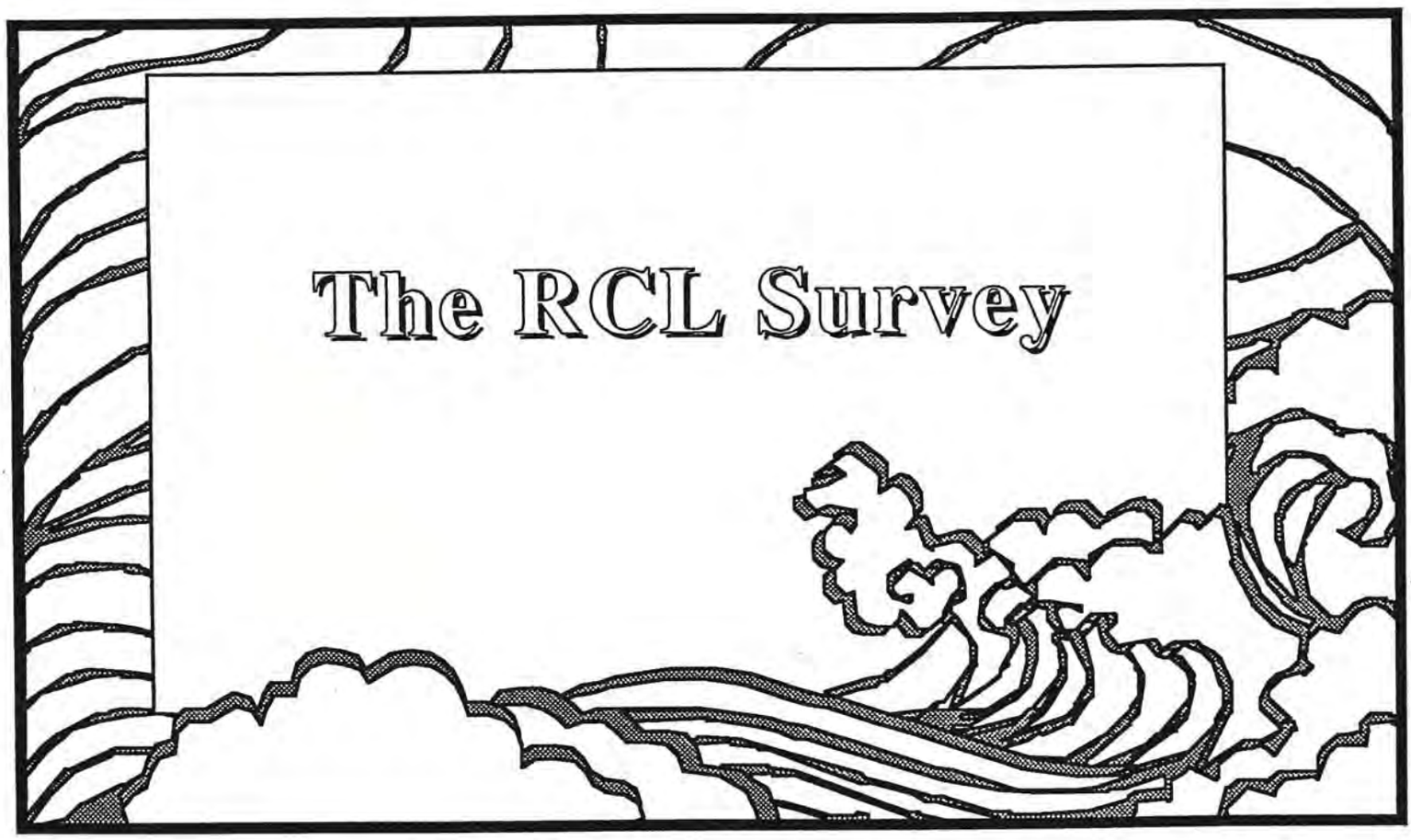
(21) What do you think are the strengths and weaknesses of RCL's competitors (for different products)?

(22) What do you think are the strengths and weaknesses of RCL's competitors (organization)?

(23) What do you think are the strengths and weaknesses of RCL's competitors (marketing capabilities)?

Anything else?

Appendix III: Survey Questionnaires for Semiconductor Industry Experts



Appendix IV: Kenichi Ohmae's Business Portfolio Matrix

Source: Kenichi Ohmae, *The Mind of the Strategist,* Penguin Books, 1982, p.141.

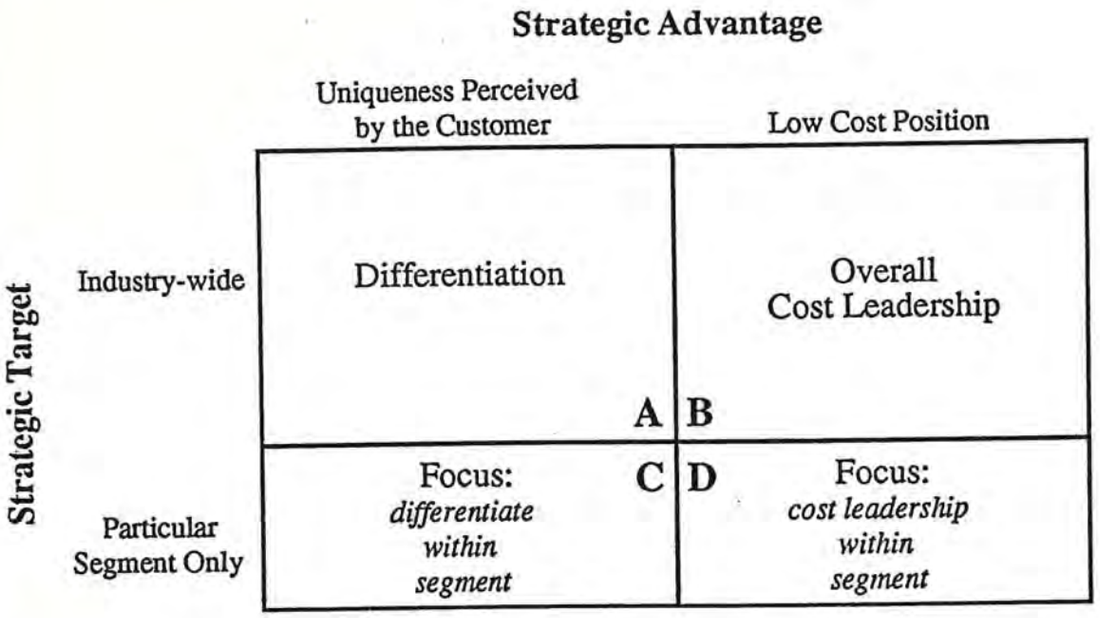
Market Attractiveness	Low	Medium	High
High	**A.** Serious entry into the market Opportunistic position to test growth prospects; withdraw if indications of sustainable growth are lacking.	**B.** Selective growth Select areas where strength can be maintained, and concentrate investment in those areas.	**C.** All-out struggle Concentrate entire effort on maintaining strength; if necessary maintain profit structure by investment.
Medium	**D.** Limited expansion or withdrawal Look for ways of achieving expansion without high risk; if unsuccessful, withdraw before involved too deeply.	**E.** Selective expansion Concentrate investment, and expand only in segments where profitability is good and risk is relatively low.	**F.** Maintenance of superiority Build up ability to counter competition, avoiding large-scale investment; emphasize profitability by raising productivity.
Low	**G.** Loss-minimizing Prevent losses before they occur by avoiding investment and by lowering fixed costs; when loss is unavoidable, withdraw.	**H.** Overall harvesting Promote switch from fixed to variable costs; emphasize profitability through VA and VE of variable costs.	**I.** Limited harvesting Reduce degree of risk to a minimum in several segments; emphasize profit by protecting profitability even if loss of market position is involved.

Corporate Strengths

Appendix V: Generic Strategies

Source: Michael E. Porter, *Competitive Strategy* (New York: Free Press, 1980), p.23.

(Adopted)



Appendix VI: Elements of Industry Structure

Source: Michael E. Porter, *Competitive Advantage* (New York: Free Press, 1985), p.6.