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ACER

A Competitve Assessment Report

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ACER INC.

A COMPETITIVE ASSESSMENT REPORT

COUNTRY: TAIWAN   TICKER: FFACE

TABLE OF CONTENTS

ACER INC.

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LIST OF EXHIBITS

ACER INC.

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ACER - THE RENAISSANCE

Objectives…..

Strengthen competitive position in the PC market with emphasis on Asia and Europe.

Focus on and establish itself as a leading player in the Internet Appliances market.

Promote direct business model in high-growth markets.

Augment competitive edge by tapping and optimizing new business opportunities.

Shift from a diverse operational base to a more customer-centric company.

Develop and pioneer innovative technologies and services.

…Their Accomplishment

Reengineering Acer

Acer Inc is well on its way to a second reorganization in a span of three years. In a bid to control escalating costs and mounting losses, the company implemented a multi-pronged strategy that involved reengineering operations in several phases. Acer intends to reduce exposure in the United States after a bitter experience in the "own brand" operations and loss of over $60 million across North America, Europe and South America in 2000. First phase of the restructuring plan witnessed Acer split its previously consolidated OEM and branded business into two separate business units - Design and Manufacturing Services unit (DMS) and Acer Brand Operations unit (ABO). Separation of Acer's OEM and branded business is expected to help the company adopt a focused and forward-looking approach that is indispensable with its ability to adapt to changing market needs.

The company's two main operations, the DMS as well as own-brand operations were not in sync with each other mainly concerning outsourcing interests. This resulted in many companies that contracted work to Acer shying away as Acer's products directly competed with their products. IBM outsourced notebook manufacturing only to find them competing with Acer's brands, which held a distinct price advantage. This necessitated the company to split its "own-brand" operations and DMS operations into two distinct business units to avoid conflicting interests. DMS now will focus on diversifying its customer base through additional expertise and value added manufacturing, design and research & development

services. ABO on the other hand is expected to enhance global competitiveness by building up brand equity. Splitting of operations further helps the company to streamline end-to-end implementation, target major customer segments and build innovative customer support services.

Additionally, Acer shifted focus to China, which is emerging as a key market with significant growth potential. The company plans to manufacture as well as market various products in Asia's largest markets, China featuring prominently among them. Acer Sertek changing manufacturing base from Taiwan to China is the first in a series of strategic shifts aimed at transferring production base to low-cost centers. In addition, Acer's European operations will be moved to low cost centers located in Eastern Europe.

The hurdle in the company's path to restructured nirvana is Taiwanese Law, which prohibits a listed company to split further into two listed companies. Acer has been able to work around the legislation by spinning off operations and establishing the new entity as an unlisted company. Other issues bogging down Acer's performance include a diverse product portfolio with minor variations among key models in desktops as well as notebooks lines. Consequently, the company trimmed product lines and standardized production processes retaining only about ten most popular variants.

Addressing the Needs of a New Economy…

Acer as part of a broader business initiative to reposition itself as a customer-centric organization, shed its old corporate identity for a new one. The new identity epitomizes its commitment to move in sync with changing industry and customer requirements. Acer's new

"soft" logo is an appropriate reflection of the new philosophy of being globally competitive by maintaining flexibility to counter market challenges. Acer is now positioned on the forefront of providing high technology software and hardware together with a touch of more human-centric services. The new identity emphasizes building of vibrant customer relationships through innovative technologies, products and value added services. The company additionally launched a teaser campaign to encourage employees to associate with the new identity and brand values.

Changing Gears…

In a move aimed at jumpstarting growth, Acer shifted focus from contract manufacturing to marketing own-brand products. The company disbanded five subgroups and consolidated operations into three subgroups and one independent unit. Triggered by a wave of canceled and delayed orders by major OEM partners - IBM and Dell, the restructuring addresses a long-standing conflict-of-interest issue between the company's own-brand and contract manufacturing businesses. Further, downturn in personal computer industry coupled with growing saturation in the US market prompted Acer to switch focus from US to Europe and Asia, particularly Eastern Europe & China.

Short-term Losses……..But Long-term Gains

In a significant departure from tradition, Acer announced intentions not to forecast current year targets considering the highly volatile nature of the global IT industry. Despite potential recessionary trends, the company retains a positive outlook for 2001. However, with a gloomy economic scene still in the picture, the company seeks to remain focused towards core markets and phase out non-core businesses. The ABO division aims to establish a strong presence in Greater China and Asia by achieving higher growth and optimizing Acer's brand advantage. For the DMS division, the outlook is impressive with rapid strides made in increasing time-to-market cycle and cutting down costs. The HIB division seeks to target core business management, primarily by watering down overlapping investments.

En route to Recovery….

Acer is expected to post substantial growth in the high-end segment from the third quarter of 2001, as the market is likely to witness potential improvement in for high-tech products. The industry is expected to bounce back with firming of orders from customers as well as suppliers. The company aims to boost performance by foraying into services and software, and developing more products with greater profitability potential.

New Areas of Focus…

Consistent with its strategy to focus on emerging markets, Acer is currently targeting the 3Es - Education, Entertainment and E-commerce, which offer tremendous scope for new product innovations, increase market share, and expand presence in new markets such as communications, consumer electronics and semiconductors. In addition, Acer announced plans to spin off software and game businesses into separate entities by the third quarter of 2001.

The company, faced with declining sales and general slump in the industry, decided to exit from the retail consumer PCs business. The move enables the company to curtail operating costs in the slow-moving US market for PCs and focus on high-margin corporate PC operations. Following Acer's withdrawal from the desktop-PC segment, IBM plans to regain lost ground by forging alliances with contract electronics manufacturers such as the one with SCI.

Acer plans to foray into the 1394 chip market dominated by Texas Instruments, which holds about 80% share. Another Taiwan based supplier of LAN chips, Realtek Semiconductor Corp., also simultaneously announced plans to enter the market posing a potential threat to foreign IC rivals. Acer released a low-cost 1394 serial I/O bus chip designed to function as both cable-connected and backplane bus. The company released an IEEE 1394 Open Host Controller Interface Link Layer chip, called the M5251, designed for mobile and desktop PCs. Acer intends to promote price as its USP to maintain a foothold in the market dominated by strong foreign players.

An Established Brand in Asia…

Acer is a well-recognized and established brand in Asia holding 10% share of the PC market. The company offers a comprehensive portfolio of branded products including multimedia PCs, high-end servers, notebooks and semiconductors. Acer's price penetration strategy has enabled the company to establish a strong brand name in Asia. Acer ranks 8th among leading fifty Asian brands.

Factors driving growth include demand for low-priced PCs and growth in notebooks, XCs and desktop PCs. Internet Appliances and PC notebooks are expected to drive Acer's growth in future. The global Internet appliance market is estimated to cross the 90 million-unit-mark by 2004 from the current 30-40 million units. Major players in the Internet appliances market include National Semiconductor Corp, Acer and Merinta.

XCs - High Growth Potential…

As worldwide PC penetration, with the exception of certain regions still remains abysmally low, the company is presented with tremendous opportunities for growth. Reflecting its overall strategy to aggressively promote new products, Acer unveiled the pioneering concept of 'XCs or X-Computer', a next generation personal computer designed for specific applications. The company predicts an extremely favorable response to XCs, which are expected to outnumber consumer PCs in the ratio of 10:1 by 2010. The new devices will be initially introduced for the 3E market segments - entertainment, education and electronic commerce, and later to service providers and component and software suppliers.

ACER - FACTS AT A GLANCE

Credentials	:	World's leading PC manufacturer, Top-of-the-mindset brand in PCs, Leading player in mobile computers, network servers and desktops. Pioneer in microprocessors.
2000 Revenues	:	NT$ 102.7 billion
Focus Areas	:	Personal computers, Internet and ancillary services, digital services, venture capital businesses, software development, & production of technologically advanced products.
Business Lines	:	PCs, Peripherals, Semiconductor & Others
Products	:	Personal computers, desktops, notebooks, servers, workstations, motherboards, peripherals, semiconductors and Internet devices.
Key Brands	:	Aspire, AcerEntra & AcerPower (Desktops) Extensa & TravelMate (Notebook Computers) AcerAltos (Servers), Acer ProStation (Workstations)
Geographical Reach	:	North America, Europe, Asia-Pacific, Latin America
Strengths	:	Innovative thinking, product portfolio, technical expertise, production capabilities, network of sales & marketing and customer support
Weakness	:	Significant exposure to emerging markets and moderate brand recognition in North America
Major Competitors	:	PCs: Compaq Computer, Dell Computer, IBM, Apple Computer and Hewlett-Packard Notebooks: Toshiba, IBM Corp., Compaq, Hewlett Packard, NEC, Fujitsu, Dell, Apple, Hitachi, Gateway and Sharp
Promotion Mix	:	TV, print, direct marketing and Internet banner ads
Strategies	:	Client-Server Organizational Structure, Fast-Food Business Model
Employees	:	3,800
Fiscal Year	:	Ends in December

BUSINESS PROFILE

An Ace in Computers
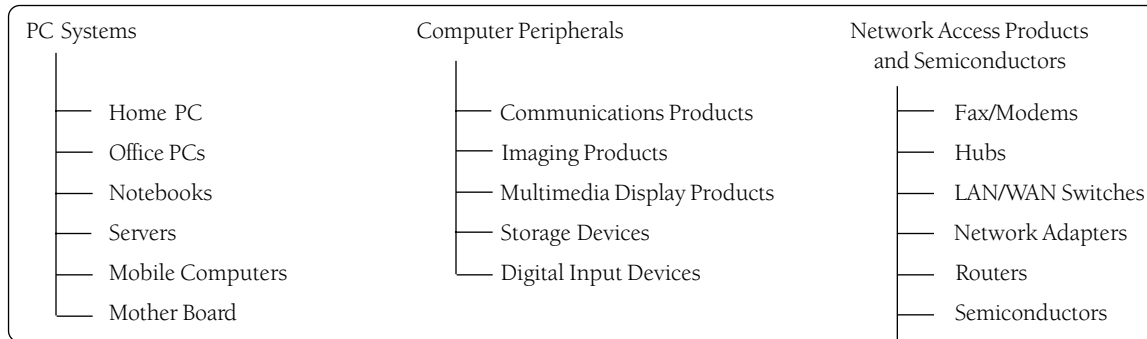
Operating on the forefront of cutting-edge technological markets, Acer manufactures a broad selection of globally recognized branded products ranging from notebooks and servers to a wide range of consumer electronic appliances. The company's roster includes industry-leading, high-end multi-user servers, multimedia PCs, notebooks, computer components, and communications devices. Acer is the largest private company and the largest importer/exporter in Taiwan. The company is an OEM supplier of PCs and other hardware products for companies such as IBM, Compaq, and Fujitsu, in addition to well-established own-brand suite of products. Further, Acer intends to strengthen its competitive position in the Internet appliance market – a family of next-generation devices primarily designed to manage home and business functions through the Internet.

Acer is one of the top ten brands in 13 countries and is ranked amongst top five brands in more than 30 countries worldwide. Established in 1976, the Acer Group is also engaged in research, manufacturing and marketing of semiconductors and consumer electronics. The Group operates through a number of companies - classified as Strategic Business Units (SBUs) or Regional Business Units (RBUs). Benefiting from skilled personnel and unmatched technological expertise, the SBUs design and manufacture high-tech components and products. RBUs are primarily responsible for regional and local sales and marketing operations.

The latest restructuring effort, aimed at streamlining operations and enhancing efficiencies in core competence areas, highlights Acer's commitment to improve its competitive position. With most of Acer's $9.5 billion revenues in 2000 being generated in Asia—where the company has established a powerhouse brand by selling top-of-the-class computers at economical prices to cost-conscious Asian customers, mainly at the expense of Western competitors IBM and Compaq—the move expands Acer's geographic reach to include new markets in Asia-Pacific, Latin America and Germany. In a survey conducted by Readers Digest in 2001, Acer was accorded the gold number one super computer brand award in Asia for the third consecutive year.

PRODUCT PORTFOLIO

PC Systems	Computer Peripherals	Network Access Products and Semiconductors
Home PC	Communications Products	Fax/Modems
Office PCs	Imaging Products	Hubs
Notebooks	Multimedia Display Products	LAN/WAN Switches
Servers	Storage Devices	Network Adapters
Mobile Computers	Digital Input Devices	Routers
Mother Board		Semiconductors

ACER – HISTORICAL PERSPECTIVE

Phase	Period	Objective	Year	Major Developments
One	1976-1985	Build Foundation	1976	Established as Sertek
			1979	Designs Taiwan's first mass-produced computer
			1981	Introduces MicroProfessor-I: Company's first branded product
			1982	Introduces MicroProfessor-II: Taiwan's first 8-bit home computer
			1983	First company in Taiwan to introduce PC/XT
			1984	Establishes Acer Peripherals Inc and Multiventure Investment Inc
			1985	Establishes AcerLand, Taiwan's first and largest franchised computer retail chain
			1985	Establishes Acer Laboratories Inc
Two	1986-1995	Globalization	1987	Acquires Counterpoint Computers "Acer" name is created
			1989	Establishes TI-Acer DRAM - A joint-venture with Texas Instruments
			1990	Acquires Altos
			1991	Introduces ChipUp - World's first 386-to-486 single-chip CPU upgrade solution
			1992	Develops world's first 386SX-33 chip set Develops recycled cardboard packaging technology to replace polystyrene
			1994	Introduces world's first dual-Pentium PC
			1995	Revenues top US$5 billion
Three	1996-Present	Brand Awareness	1996	Signs reciprocal patent licensing agreement with IBM, Intel, and TI Introduces AcerBasic - A low-cost computer
			1997	Acquires Texas Instruments' notebook computer subsidiary; Ranked world's fifth largest notebook maker Establishes Acer Softech (Shanghai) Inc. in Mainland China Introduces X Computer concept
			1998	Acquires Texas Instruments' interest in TI-Acer venture
			1999	Establishes a JV with Computer Associates to develop ACCPAC business management software
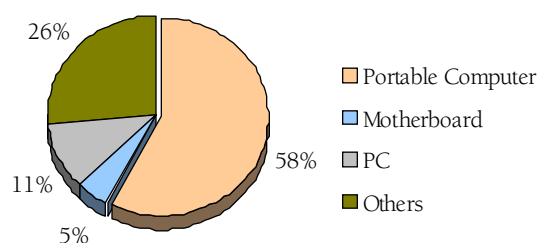
PERFORMANCE REVIEW

Brief Review of Five-months Ended May 31, 2001

Acer's revenues for the first five months of 2001 totaled NT$29.98 billion (Approx. US$880.39 million) a fall of 35% from NT$9.23 billion or US$1359.94 million recorded for the first five months of 2000. The company's revenues amounted to US$556.7 million in the first quarter of 2001, compared to US$887 million in the corresponding quarter of 2000, representing a decline of 37.23%. Revenues experienced a sharp decline owing to continued slowdown in the global economy. Revenues slumped to NT$18.1 billion, a fall of 37% over previous year's NT$28.84 billion. The company's Acer-brand operations reported modest results owing to European operations turning profitable. In a bid to counter dwindling revenues and a depressing economic scenario, Acer laid-off approximately 8% of workforce in the first quarter of 2001.

Operating Revenues by Product Category: 2000 (NT$ in '000s)

Product	2000	% of Total
Portable Computer	62,019,186	57.60
Motherboard	5,301,650	4.92
PC	11,930,078	11.08
Add-on Card	692,872	0.64
CD-ROM	-	0.00
Others	22,811,820	25.76
Total	102,755,605	100.00

Product-wise Domestic and Foreign Revenues for 2000 and 1999 in Units
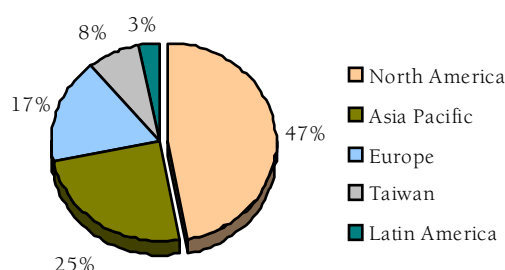
Product	2000 Sales Units			Change in %			1999 Sales Units		
	Domestic	Foreign	Total	Domes.	Foreign	Total	Domestic	Foreign	Total
Portable Computer	74384	1665657	1740041	6.98	8.89	8.81	69533	1529678	1599211
Motherboard	23780	1745605	1769385	-46.28	-35.65	-35.83	44266	2712874	2757140
PC	11347	573001	584348	68.03	-29.51	-28.71	6753	812919	819672
Add-on Card	411922	1733411	2145333	497.52	-41.69	-29.47	68939	2972869	3041808
CD-ROM	---	---	---	-100	-100	-100	322	248	570
Total	521433	5717674	6239107	174.71	-28.78	-24.08	189813	8028588	8218401

Domestic and Export Revenues as a Percentage of Total Revenues for 2000 and 1999

Product	2000		1999	
	Domestic	Foreign	Domestic	Foreign
Portable Computer	4.50	95.50	4.27	95.73
Motherboard	2.46	97.54	1.51	98.49
PC	1.86	98.14	0.84	99.16
Add-on Card	6.96	93.04	2.49	97.51
CD-ROM	-	-	35.99	64.01
Others	10.27	89.73	10.38	89.62
Total	5.61	94.39	5.14	94.86

Sales Breakdown by Geographic Region: 2000 (US$ in million)

Region	Revenues	% Share
North America	4,465	47
Asia Pacific	2,375	25
Europe	1,615	17
Taiwan	760	8
Latin America	285	3
Total	9,500	100

An Overview of the Year Gone By – 2000

Acer under-performed during the year 2000 owing to the general slump in the global economy as a whole, and the PC industry in particular. Demand for PCs plummeted sharply bringing down revenues and profits for the industry in its entirety, with few players escaping unscathed. Acer's revenues registered a 19.87% decline over the previous year reaching NT$102.756 billion, much below anticipated revenues. The huge deficit is attributable to a downturn in the PC market and loss of key OEM customers.

To counter stiff challenges posed by a difficult operating environment, the company is in the process of implementing rapid restructuring initiatives with renewed focus. In furtherance of this refocused strategy, the company structured operations into three distinct entities: Acer Brand Operations (ABO); Design, Manufacturing and Services (DMS); and Holding & Investment Business (HIB). The strategy is aimed at infusing a customer-centric approach so as to sustain competitiveness in the global market driven mainly by service and innovation philosophy. The new organizational structure further seeks to eliminate long-standing conflicts between the OEM and brand business.

As part of cost-cutting efforts, Acer laid off about 8% of the workforce, curtailed operating expenses drastically and divested certain non-core business interests. In consequence, the company's overall operational placing was on an upswing at the end of the year. Restructuring also addressed several of the company's management concerns resulting in noticeable improvement.

Spurred by a robust PC market and entry into the Internet Appliances and network peripherals market, Acer's sales grew at rates higher than that of the industry in 1999. Sales soared from $6.7 billion in 1998 to $8.4 billion fueled by strong performance in core business areas. Aggressive promotional activity for new products such as Veriton FP2 and TravelMate 350 not only boosted sales but also proved to be a major brand-building exercise. Steady demand for desktop and notebook computers and popularity of low-priced PCs worldwide helped strengthen bottom line. Additionally, PC shipments increased as new products incorporating advanced features such as Cyber TV, Internet telephones and small mobile phones, hit the market. Sales of peripherals remained steady while semiconductor sales, particularly the TI-Acer DRAM business, witnessed a downturn on account of a slump in the semiconductor industry in general and the DRAM market in particular.

GROWTH STRATEGIES

Innovative Thinking – Acer's Core Competence

Acer's success is primarily attributed to innovative thinking and a pro-active approach towards changing customer needs. The company strives to identify new opportunities and gives shape to creative pioneering concepts. Acer calls it "a fresh perspective" - a way of thinking that is reflected in everything it does. 'The company is packaging its i-solutions into three basic categories - i-enabling products; i-enabling technology and i-enabling content & services. In addition, the new 'X computer' concept and Aspire Park project exemplify this perspective.

Strategic Alliances: Enhancing Growth Prospects

One of Acer's core growth strategies is to form strategic alliances that accrue synergies to the company and its partner. Consistent with this strategy, Acer licensed Palm Inc's Palm OS platform to design and develop the first Acer Mobile Device. The move is part of Acer's Mobile Data Strategy aimed at providing easy wireless access and exchange of enterprise and personal information via a handheld computer. The alliance provides a head start to Acer's long-term business plan as a major player in the mobile data industry — not only in the device market but also as a single-source infrastructure and end-to-end mobile solutions provider.

Additionally, the partnership widens the reach of Palm's industry-leading handheld platform to a new population of customers and developers in the Asia Pacific region. As part of the agreement, the two companies will jointly develop traditional and simplified Chinese language versions of the Palm OS platform for the Asia Pacific region.

The company signed a seven-year agreement with IBM. Under the terms of the agreement, Acer will outsource IBM's microelectronics, hard disc drive and networking technology while IBM's components and technology will be incorporated in Acer's desktops, notebook computers and servers. In 1999, the company entered into an agreement with Cisco to promote Internet Protocol Technology Solutions.

Client-Server Model: A Solid Foundation

Acer operates on a client-server model wherein the parent operates a network of individual companies jointly sharing technology, marketing experience, global sales channels and financial and other resources. The structure enables the company to improve operational flexibility, efficiency and productivity. The parent company acts as the 'server' for the Group's diverse base of 'client' business units. Major benefits of the 'client/server' structure include autonomy, flexibility, and responsiveness to customer needs.

Product Development Strategy

The company's product development strategy primarily focuses on designing and developing revolutionary products by cashing in on its technological expertise. The strategy also facilitates blending of complementary technologies to develop and produce products for the ever-expanding commercial and consumer markets. Apart from OEM sales, which account for about 50% of consolidate revenues, the company offers products under a host of other well-recognized brand names.

With the recent growth in 3E markets, the company revamped its product portfolio by forging new ventures in the areas of semiconductors, communications, and consumer electronics. Addition of new products - such as set-top box digital Internet access devices, GSM digital cellular phones and wireless communications equipment - enhanced the company's technological expertise and augment the development of mainstream PC products.

Fast-Food Business Model

The fast-food business model facilitates Acer to be more responsive and adopt a pro-active approach to market changes. Acer's strategy to assemble products at the local RBU's using components supplied by the SBUs enables efficient management of inventory consequently reducing time to market. The company has envisioned itself to adapt to the environment by delivering newer products and adopting a more efficient production strategy to maintain lower levels of inventory. Customer orders are executed afresh instead of following

a policy of continuously running assembly lines and maintaining inventory. Moreover, by placing SBU production facilities closer to key markets, Acer considerably shortened the time frame for component production to final product delivery process.

Countering the PC Slump

To counter challenges posed by declining market for PCs worldwide, Acer has implemented several measures designed to improve its standing in the marketplace. Acer adopted aggressive organizational re-structuring program that entailed division of OEM and brand businesses into separate units - Design, Manufacturing and Services (DMS) and Acer Brand Operation (ABO) respectively. DMS division plans to develop profitable product lines such as PDAs and IAs, as well as innovative desktop and mobile PCs. The move is aimed at attaining economy of scale through mass production.

ABO's revived marketing strategy focuses on allocating resources with increased flexibility and effectiveness, aimed at attaining right admixture of products and markets. The Mainland Chinese market will be considered as a primary target and impetus will be given on provision of e-solutions and e-business to customers worldwide. The company heavily relies upon OEM supply of key raw materials such as CPU, Disk Drive and DRAM, and liquid crystal display (LCD) sourced from foreign sources including USA, Japan and Singapore. Only power supplies and printed circuit boards are domestically sourced from Taiwan. To counter increased dependence on unreliable import of key components, the company has forged strategic alliances with CPU and disk drive suppliers thereby ensuring reliable outside sourcing.

Acer's overall business strategy is aimed at providing highly innovative products and services and emerging as a major contributor to the burgeoning global digital economy. The company plans to achieve leadership positions in each of its individual areas of operation. In case of non-core businesses, the company intends to shift to more profitable avenues or entirely exit from the segment through mergers with other companies within the Acer Group or outside.

Increased Thrust on Marketing

Acer America is expected to place increased emphasis on marketing activities in the US to counter competition from technology powerhouses such as IBM, Dell and HP. The company endeavors to develop next-generation Internet appliances (IAs) and foray into new businesses. The brand strategy is aimed at moving up the ladder from the current position to the top five in the high-tech chain, which is characterized by an overwhelming domination by Dell, IBM, Compaq, HP and Gateway.

Acer aspires to take on networking giants in the US market with the formation of two new business units Acer Nuweb and Acer Nexus, which are likely to be spun off in the near future. While

Nuweb focuses on marketing of wireless devices to consumers and small-to-medium sized business, Nexus offers local area network (LAN) and related networking technology solutions. The focus of Acer's advertising is representative of the new breed of next generation products with emphasis on innovation and reliability. The company is to be positioned as unique one-stop hardware and services provider.

Product Innovation Strategy

Acer continues to invest in research and development of innovative products that address a diverse and versatile client base. The company strives to make the most of the opportunities provided by the IT industry - by focusing on areas where it holds excellent technological expertise, followed by integrating complementary technologies to design high-quality high-performance products. To this effect, Acer is reducing costs and manufacturing new and advanced products through flexible operational designs.

Research and Development

The company's R&D strategy includes intense efforts and resources in developing PDAs, IAs, e-solutions and e-business in addition to desktop and mobile PCs, video and Internet phone and Tablet computer. Acer undertook renewed R&D efforts in 2000, which resulted in development of several innovative products that attained worldwide recognition. Total R&D spending was NT$2,649.993 million, a rise of 18.42% over 1999 levels of NT$2,237.84 million. A few products receiving significant acclaims or awards in 2000 include Acer Veriton FP2 LCD PC, Acer TravelMate 739 mobile PC, TravelMate 340T mobile PC, and TravelMate 350 Acer Altos SA50 server appliance.

MARKET OVERVIEW

PERSONAL COMPUTERS

Bearing the Brunt of Slowdown

Optimistic projections peg global PC demand to grow 10.5% in 2001 compared with 16 per cent last year. Global shipments of PCs totaled 132 million units in 2000 as growth remained relatively lower in comparison to 1999 levels. Major factors responsible for the downward trend include overall global economy slowdown, sales decline in the months of September and December and falling demand for home PCs. The US and Western Europe representing world's largest PC markets, witnessed declining growth trend in 2000. PC shipments reached 0.48 million in the US, recording a modest growth of about 7.3% over 1999 figures. The Western European region recorded a 7.5% growth in the PC shipments in 2000 from 0.29 million units in 1999.

In contrast to bleak growth prospects in the US and Western Europe, Asia-Pacific (excluding Japan) registered robust growth of about 39% with Japan recording 39.4% growth. The Asia-Pacific region is set to emerge as the most significant and fastest growing PC market in the near future. The weakened global PC market in 2000 reflected upon the profitability of several companies in the industry. However, companies tried to restore lost ground with several strategic restructuring initiatives including revamping of marketing strategies.

To counter the saturating market for PCs, companies are expected to come out with innovative products such as PDAs, smart phones and set-top boxes to tap the potential for alternative revenue generating streams. A notable trend witnessed in the PC market is the increasing popularity of mobile PCs despite dwindling overall PC demand.

Handheld Computers: Growing Popularity

With the technology revolution on a downslide, the personal computer industry is set to witness a gloomy year in 2001. The market is unlikely to regain its lost glory at least until mid-2001 until when the industry would have to wait for the next technology wave to pick up. Continued fall in revenues and profitability for many PC makers through the first half of 2001 is likely to result in downsizing of PC manufacturing operations in the years to come. However, handheld computers hold vast potential to gain significant headway in the market following the addition of wireless capabilities. Laptop computers, one of the better performing segments in the PC industry in terms of revenues, is gradually losing ground with the advent of handheld computers with wireless capability.

Mobile Phone: Potential Revenue Earner

Taiwan production of mobile phones accounted for nearly 2% of the global production figures. The trend of several mobile manufacturing majors outsourcing manufacturing to low-cost centers such as Taiwan is likely to catch on and result in Taiwan accounting for over a tenth of global production estimates in 2001. Global demand for mobile phones is estimated to be worth about 500 million units, up 5% from 475 million units in 2000. Acer Communications expects to up its production by about 25% to 5.9 million units in 2001.

PCs: Driven by Shorter PLCs

Intense competition, price wars, ever-changing customer preferences, rapid technology developments, and continuous disputes over intellectual property characterize the worldwide PC market. Frequent product launches by major players have resulted in short product life cycles. Therefore, it is imperative to constantly

review customer preferences while planning product transitions. Difference in prices of new and old products also plays a major role in customer purchase decisions.

Fourth quarter shipments increased on account of booming consumer market in Japan and Asia-Pacific. Increase in sales volume is attributed to the growing popularity of the Internet, significant changes in product design, and low prices. Russia and Brazil, emerging from economic stagnation, also contributed significantly to the growth while sales in Canada and Middle East posted a strong performance. Year 2000 issue did not affect the market significantly as purchases by small and medium businesses more than neutralized lack of spending by big corporations.

Market Trends
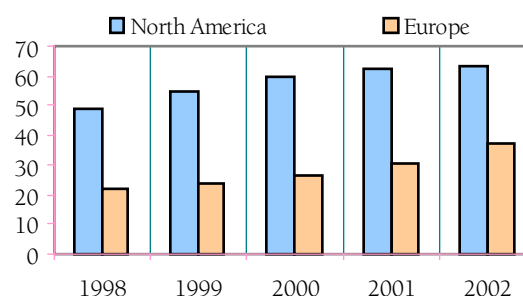
Rapid growth in Asia was partially negated by unforeseen natural events such as the Taiwan earthquake, which disrupted supply chains of several PC vendors. However, inventory positions of all major PC vendors improved in comparison to 1998 owing to better logistics management. The year 1999 also witnessed major vendors switching over to the 'Dell' sales model, although companies such as HP and Compaq embraced both the 'direct' and 'channel' sales models. While emphasis in the US was on tapping consumer PC demand, market expansion continued to dominate worldwide PC market.

Shipments and Market Share of Leading PC Vendors Worldwide: 2000 (Units in '000s)

Company	% Share	Units
Compaq	13.3%	17,425
Dell	11.5%	15,067
Hewlett-Packard	8.0%	10,481
IBM	7.0%	9,171
Fujitsu Siemens	5.0%	6,551
NEC	4.5%	5,896
Gateway	4.0%	5,241
Apple	3.0%	3,930
Acer	3.0%	3,930
Toshiba	3.0%	3,930
Sony	1.5%	1,965
Legend	1.5%	1,965
eMachines	1.0%	1,310
Samsung	1.0%	1,310
Trigem	0.5%	655
Others	32.3%	42,318
Total	100.1%	131,145

Homes Owning One or More Desktop PCs: 1998-2002E
(In Percentage)

Years	North America	Europe
1998	48.7	22.0
1999	54.8	23.7
2000	60.1	26.4
2001	62.3	30.7
2002	63.5	37.2
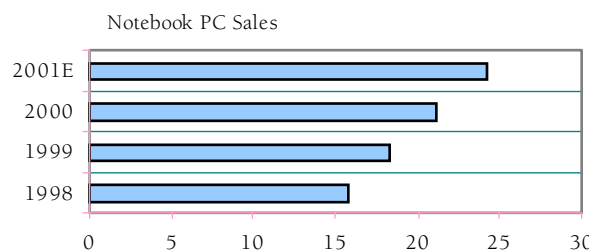
Commoditization of the PC Market

The worldwide PC market shows a distinct shift towards commoditization the trend being more dominant in 1999. Success in this segment primarily depends on the vendor's ability to penetrate the market with both low- and high-end products, and by adoption of new optimized manufacturing and distribution model. Speed and coordination in the supply chain are essential to market success in the fast moving IT business.
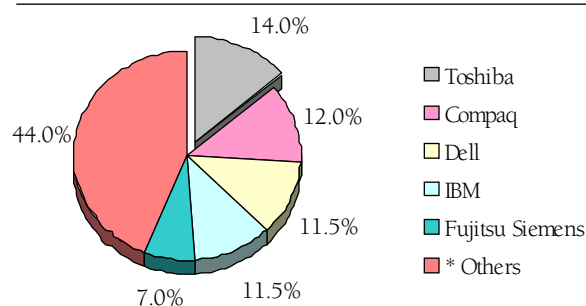
Worldwide Notebook PC Market: 1998-2001
(Units in 000's)

Year	Notebook PC Sales
1998	15.70
1999	18.30
2000	21.10
2001E	24.20

Market Share of Leading Vendors of Portable Computers Worldwide: 2000 (Units in '000s)

Company	% Share	Units
Toshiba	14.0%	3,639
Compaq	12.0%	3,119
Dell	11.5%	2,989
IBM	11.5%	2,989
Fujitsu Siemens	7.0%	1,820
NEC	6.5%	1,690
Sony	6.0%	1,560
Acer	4.0%	1,040
Hewlett-Packard	4.0%	1,040
Apple	3.0%	780
Gateway	2.0%	520
Sharp	2.0%	520
Panasonic	1.5%	390
Hitachi	0.5%	130
Others	14.5%	3,769
Total	100.0%	25,993

*Include NEC, Sony, Acer, HP, Apple, Gateway, Sharp, Panasonic & Hitachi

Number of Mobile Subscribers using Location-based Services Worldwide: 2005

Region	Subscribers (in million)
North America	148
Western Europe	188
Eastern Europe	4
Central/South America	12
Middle East	5
South Africa	7
Asia-Pacific	29
Total	393

The worldwide portable PC market reported volume sales of about 26 million units in 2000. Toshiba, Compaq, Dell and IBM accounted for nearly 50% of the market.

REGIONAL MARKET ANALYSIS

USA
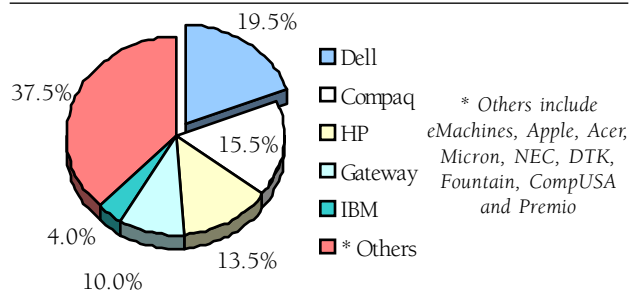
PERSONAL COMPUTERS

PCs: Declining Fortunes

The US PC market is fast reaching a state of saturation. Personal computers and the Internet have become indispensable tools of American life. Cut-throat competition and unfavorable economic situation has prompted the industry to focus on strategy implementation and product positioning with respect to changing market trends. Dell and Compaq lead the intensely competitive US PC market where new technologies and customer satisfaction dictate sales. In addition to Acer, other major players in the portable and desktop segments include IBM, Hewlett-Packard and Toshiba. PC penetration in US households reached 52.5% (53 million homes) in the beginning of 1999. The market witnessed a rapid increase in PC penetration during 1995-1998, reaching a substantial 42% in 1998. Increased Internet applications coupled with decreasing prices are expected to increase PC penetration to 65% of the US household sector by 2003.
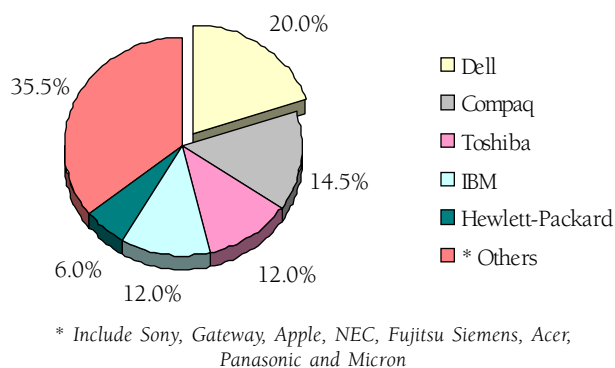
Shipments and Market Share of Leading Desktop PC Vendors in the US: 2000 (Units in '000s)

Company	% Share	Units
Dell	19.5%	6,310
Compaq	15.5%	5,015
Hewlett-Packard	13.5%	4,368
Gateway	10.0%	3,236
IBM	4.0%	1,294
eMachines	4.0%	1,294
Apple	4.0%	1,294
Acer	2.5%	809
Micron	1.5%	485
NEC	1.0%	324
DTK	0.5%	162
Fountain	0.5%	162
CompUSA	0.5%	162
Premio	0.5%	162
Others	22.5%	7,281
Total	100.0%	32,358

* Others include eMachines, Apple, Acer, Micron, NEC, DTK, Fountain, CompUSA and Premio

Market Share of Leading US-based Vendors of Portable Computers: 2000 (Units in '000s)

Company	% Share	Units
Dell	20.0%	1,903
Compaq	14.5%	1,379
Toshiba	12.0%	1,142
IBM	12.0%	1,142
Hewlett-Packard	6.0%	571
Sony	5.5%	523
Gateway	4.5%	428
Apple	4.0%	381
NEC	2.0%	190
Fujitsu Siemens	1.5%	143
Acer	1.5%	143
Panasonic	1.0%	95
Micron	1.0%	95
Others	14.5%	1,379
Total	100.0%	9,513

* Include Sony, Gateway, Apple, NEC, Fujitsu Siemens, Acer, Panasonic and Micron

Leading Vendors of PCs in the US – 1998 & 1999 (Units in '000)
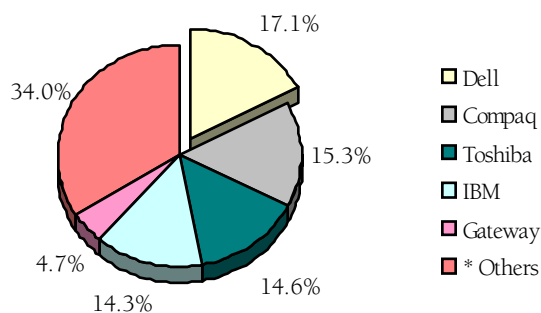
1999 Rank	Company	1998 Volume	1998 Mkt Share	1999 Volume	1999 Mkt Share	YoY Growth
1	Dell	4,799	13.2%	7,492	16.6%	56%
2	Compaq	6,052	16.7%	7,222	16.0%	19%
3	Gateway	3,039	8.4%	4,001	8.9%	32%
4	Hewlett-Packard	2,832	7.8%	3,955	8.8%	40%
5	IBM	2,983	8.2%	3,274	7.2%	10%
	Others	16,549	45.7%	19,248	42.5%	16%
	All Vendors	36,254	100.0%	45,192	100.0%	25%

* Shipments are exclusive of OEM sales for all vendors; * Shipment data for NEC/PBNEC includes Packard Bell, NEC, NEC Japan, NEC China, and ZDS.
* Shipment data for Compaq includes Compaq, Digital Equipment, and Tandem.
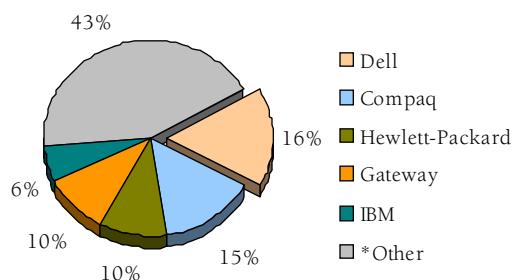
Market Share of Leading US-based Vendors of Portable Computers: 1999 (Units of '000s)

Company	% Share	Units
Dell	17.1%	1,353
Compaq	15.3%	1,211
Toshiba	14.6%	1,155
IBM	14.3%	1,132
Gateway	4.7%	372
Apple	4.1%	324
Sony	3.6%	285
NEC/Packard Bell NEC	3.0%	237
Hewlett-Packard	1.9%	150
Fujitsu Siemens	1.8%	142
Acer	1.5%	119
Panasonic	1.2%	95
Micron	1.0%	79
Micro Electronics	1.0%	79
CTX	1.0%	79
Other	13.9%	1,100
Total	100.0%	7,913

* Include Apple, Sony, NEC/Packard Bell NEC, Hewlett-Packard, Fujitsu Siemens, Acer, Panasonic, Micron, Micro Electronics and CTX

Market Share of Leading Desktop Computer Vendors in the US: 1999 (Factory Shipments by OEMs – Units in '000s)

Company	% Share	Units
Dell	16%	5,747
Compaq	15%	5,388
Hewlett-Packard	10%	3,592
Gateway	10%	3,592
IBM	6%	2,155
eMachines	5%	1,796
Apple	5%	1,796
NEC	4%	1,437
Acer America	3%	1,078
Micron	1%	359
Other	25%	8,980
Total	100%	35,920

Others include eMachines, Apple, NEC, AcerAmerica & Micron

Internet – Major Driver

Internet is currently the single largest force driving the US PC market. Several PC marketers have tied up with ISPs and Internet foyers to increase their sales by providing rebates to customers enrolling for long-term Internet Service Provider deals. Further, declining PC prices and rising consumer interest led to the development of new Internet applications. Some of the leading non-direct players in the industry including IBM, Compaq and HP are working out new equations to increase their direct operations, reduce costs, strengthen sourcing pacts, enhance production techniques and provide online technical support operations.

Economy Models Rule the Market

High demand for increased processing speed, memory and hard disk drive space resulted in instability in PC pricing. Most of the recently developed software packages in the US are independent of processor speed. Consequently, demand for inexpensive machines that support interoperable software has increased significantly.

Buyer Profile

About 40% of the new PCs manufactured in the US in 1999 were targeted at new buyers. The user profile is likely to change with about 63% of customers likely to belong to the under-graduate category. Approximately 68% are expected to figure in the income range below US$35,000, and about 75% do not use computers at workplace. Majority of the new users are expected to be beginners or learners.

Small Business

The number of small businesses operating in the US totaled about 2.3 million in 1999. This market presents numerous opportunities for IT VARs and independent retailers. Small businesses spent most of their IT budget for networking their computers in 1999. The average spending on IT products and services by a small business was estimated to be about US$13,900 during this period.

Prompted by strong US employment growth, new technology initiatives, Y2K solutions and increasing Internet access, the US small business PC market grew at a robust pace in 1999. Business, health and financial services, communications and technology development, and environmental industries were areas that exhibited maximum growth.

Technology deployment for small businesses based in the United States primarily involves PC upgrade, networks upgrade and more emphasis on employee skills and training. These goals open up opportunities for channel players to increase their sales and earnings in the market. Typically, small businesses depend on smaller VARs, particularly independent retailers for solutions in areas such as hardware, software, service and support.

JAPAN
Low Penetration Rate Presents High Potential for Growth

Japanese PC shipment growth is likely to slump to 13% in 2001 from 21% recorded in 2000. The scenario remains tough for most PC manufacturers in Japan. Factors such as falling prices, inroads by new competitors both domestic and foreign, and more demanding customers eroded profit margins to negligible levels. Dell and upstart supplier Sotec led the move to cut prices while Japanese PC makers continue to offer higher priced versions with expensive features. Declining memory and microprocessor prices also resulted in falling prices.

However, Japan's low personal-computer penetration ratio is likely to absorb the impact of a slowdown in technology spending. Compared with their US and European counterparts, relatively few Japanese own PCs which led manufacturers to forecast strong demand growth.

Japanese PC shipments in 1999 increased to 9.9 million units primarily on account of strong sales in the consumer segment, coupled with resurgence in demand from the corporate sector. The corporate sector accounted for over 70% of the total PC market, while mail order PC sales through the Internet and telephone accounted for a mere 5%. Leading mail order PC sellers including Dell Computer and Gateway 2000 plan to increase sales through the channel by over 30%. Sales growth in these segments is attributed to increased usage of Internet in both professional and non-professional end-use segments. An increase in home use of Internet, demand for competitively priced desktop PCs, increased corporate penetration, and rise in purchases of high-performance notebook and sub-notebook PCs were the major factors that triggered growth in the Japanese PC market.

NEC, Fujitsu and Toshiba Share Honors

NEC, Fujitsu and Toshiba are leading manufacturers of personal computers in Japan. Hitachi, Matsushita, Mitsubishi, Sharp, Sony, and Epson are the other major players in the market. US companies active in the Japanese PC market include IBM, Compaq and Apple. Although US companies dominate semiconductor microprocessors (CPUs) market, domestic manufacturers concentrated on the production of high performance multimedia PCs and peripheral systems, to maintain their share in the market. A majority of major players have shifted manufacturing units to other Asian countries to reduce production costs, thereby maintaining competitive prices with US imports. Price, performance, quality, brand recognition, efficient delivery, strong distribution, and efficient customer service are the major factors that determine competition in the market.

Leading Vendors of PCs in Japan: 1999

Rank	Company
1	NEC Corp.
2	Fujitsu Ltd.
3	IBM Japan Ltd
4	Toshiba Corp.
5	Hitachi Ltd.

ASIA-PACIFIC

China

China Drives PC Growth for Acer

- In the year 2000, Acer reported record surge in sales of PCs in Mainland China. Revenues amounted to US$187.5 million representing record growth of 200% over the previous year. Results were in direct contrast to the global trend of declining PC sales. Total shipments posted a splendid 240% increase over 2000 levels catapulting Acer into the list of top five branded PC

vendors. Strong marketing campaigns coupled with introduction of a series of product lines at competitive prices offering a variety of features led to unprecedented growth in Acer's PC sales in China.

- Acer's expansion plans for China focus on major corporate customers offering e-solutions to small and mid-sized companies. Establishing stronger distribution channels is one of the strategies to tap vast potential in the Chinese PC market. Acer plans to establish about 1,000 retail stores across major cities in China and pursue expansion of distribution channels with 500 additional stores every year.

- Acer successfully executed an e-channel management information system in China to streamline operations, improve efficiency and curtail operating expenses. The success led to further expansion of e-channel system to more cities across China. To enhance customer service, Acer negotiated with local vendors for supply of PC spare parts and is contemplating setting up spare parts centers in 50 Chinese cities by 2001.

- Acer is also pushing for extensive usage of Internet technology to facilitate smooth and efficient provision of quality customer services. The IT market holds tremendous potential as China's signing of WTO opens up more lucrative avenues for global companies. China is poised to replace Germany as the world's third largest IT market by 2001, and vie with Japan for the second spot by 2002.

PERSONAL DIGITAL ASSISTANTS

Bucking the Trend

In the year 2000, 425,000 PDAs were sold in China and about 65,000 in Taiwan. The market is estimated to grow at about 30% a year to reach the one million mark in China alone. Reflecting a similar trend, the Taiwanese market is expected to grow at a CAGR of 45% to cross the 210,000 mark by 2003. Acer along with competitor Twinhead International garnered nearly 10% of the notebook market in 2000. Legend retained the top spot in China with a market share of about 23%, followed by IBM with 20% and Toshiba with 18%. NEC and Compaq were the other major players.

Acer's Chinese operations accounted for nearly half the company's total worldwide production of peripherals such as keyboards, scanners and monitors. The company plans to increase motherboard production in China with a view towards increasing PC production contribution to over 50% by the close of 2006. The company's Taiwanese production will be focused on capital intensive and other emerging technology products such as network communication devices, TFTs and LCDs. Acer Communication & Multimedia sells nearly 1.2 million CRTs a year as OEM equipment to HP and IBM and about 50,000 CRTs a month in China.

Considering the fact that over 75% of the world's PDAs work on the Palm OS, the deal with Palm makes Acer the first Taiwanese company to license the product. Other popular operating systems for hand-held computing devices include Linux and Windows CE. Leading companies in the PDA market include Mitac, Inventec Computer, Micro-Star International and CMC Magnetics. Priced at an expected US$500, SlimMate Acer's first PDA competes directly with Mitac's Linux-oriented CAT Bluetooth PDA.

Increased Political Tension Fails to Stop Taiwanese IT Companies from Investing in China

Increased political tension building up between Mainland China and Taiwan failed to have any material impact on investments by Taiwanese IT companies. Acer led the fray by investing in various plants in China the latest being the mainboard plant with annual capacity of over 6 million units. However, financiers exhibited extreme reluctance to fund Chinese projects due to escalating political tensions between the governments. Shortage of domestically available components in China proved to be a hindrance for Acer, which is importing components such as PC boards and capacitors from Taiwan after paying a hefty value-added tax. Another inhibiting factor for Acer's operations in China is the problem of importing raw materials into and exporting finished products out of China, as over 70% of the company's production is earmarked for exports.

PC Shipments Exceed Three Million

Excluding Japan, overall PC sales in Asia-Pacific increased 29.8%, reaching 6.46 million units in the first half of 1999. The second half witnessed higher growth in PC shipments owing to economic recovery, price decline and government tenders. Shipments during this period crossed the 3 million mark reaching 3.5 million units and valued at US$4.8 billion. IBM, Compaq, Acer, Legend and Samsung are leading PC manufacturers in the region. IBM is the market leader, especially popular in Korea, Taiwan and Australia.

China and India: Immense Potential

China and India are expected to emerge as leading PC markets in the Asia-Pacific region in the next 3-4 years. The market is currently in a recovery phase characterized by dropping product prices and stabilizing international exchange rates. Despite positive growth trends in the region, the market is susceptible to political instability in India, Malaysia and Indonesia. Additionally, strained Sino-American relations also cast a shadow on continued growth in the Asia-Pacific PC market. Further, the market is also highly sensitive to availability of low-cost desktops.

Malaysia – An Expensive Production Base

Manufacturing operations in Malaysia are getting expensive more so in the semiconductor business. The main contributor to rising costs is a key input, labor. Given the scenario, companies have the option to either reposition as manufacturers of higher-end products or move existing manufacturing operations to other low-cost centers. The option to switch to higher-end products offers improved margins but comes with a lead foot in terms of upgrading employee skills. The option to relocate operations to lower cost centers is a prudent cost-cutting measure, but only in the short run. Cost cutting efforts transfer the company's focus to lower end products where competition is normally fierce and price-based thereby creating a drag on margins.
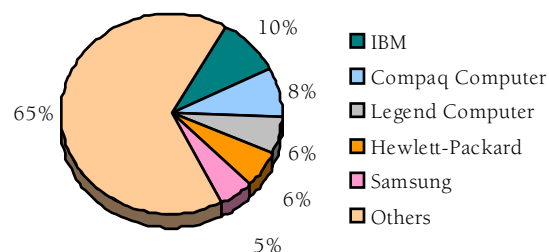
The country is also facing an acute shortage of quality engineers making many semi-conductor based companies rethink strategies that involve setting up a production base in the country. Acer too was among the companies that scaled down production exposures in the country owing to these reasons. For manufacturers shying away from Malaysia, more favorable options are countries that have a lower labor cost and/or oversupply of labor such as Thailand or China.

PC Sales Growth in Major Asia-Pacific Markets: H1 99

Country	Growth Rate (%)
Taiwan	70
South Korea	65
India	38
China	20

Leading PC Companies in Asia-Pacific Q2: 1999

Company	Market Share (%)
IBM	9.5
Compaq Computer	7.6
Legend Computer	6.0
Hewlett-Packard	5.8
Samsung	5.3
Others	65.8
Total	100.0

10%
8%
6%
6%
5%
65%

- IBM
- Compaq Computer
- Legend Computer
- Hewlett-Packard
- Samsung
- Others
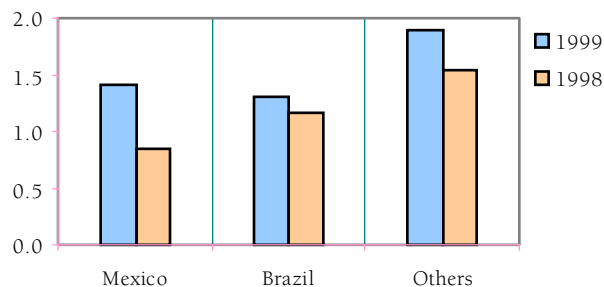
LATIN AMERICA

Desktop PCs Rule the Market…

The Latin American desktop and notebook PC market in the third quarter of 1999 generated sales worth US$1.5 billion. Unit sales totaled 1.63 million units owing to a general turnaround in the market and a boom in the Mexican market. The single most important factor that buoyed up sales was an unprecedented growth of over 82% in sales of desktop PCs. Vendors now offer Internet-ready PCs and easy financing schemes, aiming to garner market share in the home and small businesses segments. An increase in the number of domestic PC assemblers and small integrators in Venezuela, Chile and Brazil also contributed to increased sales.

Dell has stepped up its emphasis on the Latin American PC market where it held just 2.9% share in 1998. The company announced plans to introduce new and advanced PC models into the market, besides setting up PC manufacturing facilities in the region. Major players in the Latin American PC market include Compaq, IBM, Dell, Hewlett-Packard and Acer. The company intends to offer high-quality products at low prices and back it up with good customer service.

PC Market in Latin America (In Million Units): 1998-99

	1999	1998	Growth % (99/98)
Mexico	1.4	0.84	65
Brazil	1.3	1.15	13
Others	1.9	1.54	23
Total	4. 6	3.53	30
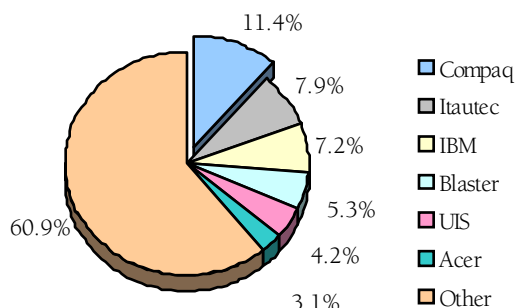
PC market in Latin America posted a strong 30% growth in 1999 with shipments reaching 4.6 million units.

Mexico led the market with sales of 1.4 million units, accounting for over 30% of the overall Latin American market followed by Brazil, which ranked second with sales of 1.3 million. However, the growth rate was comparatively lower at 13%. Overall, top six players accounted for more than 50% of the market. Compaq led the market shipping over one million units and garnering 22.1% share. IBM

followed with 8.6%; Acer captured 6.8% of the market while HP held 5.9%, Alaska 3.8% and Dell 3.6%. Other brands accounted for 49.1% of the market in 1999. Dell emerged as the fastest growing brand with 86% growth.
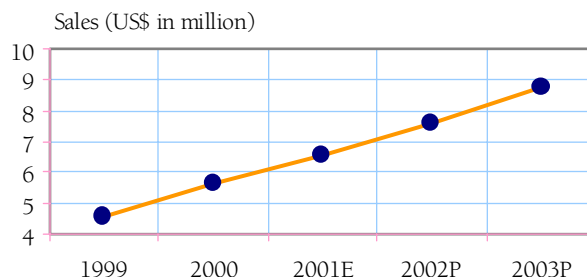
Market Share of Leading PC Vendors in Brazil: 2000

Company	% Share
Compaq	11.4%
Itautec	7.9%
IBM	7.2%
Blaster	5.3%
UIS	4.2%
Acer	3.1%
Other	60.9%
Total	100.0%

Notebook & PCs Market in Latin America: 1999-2003
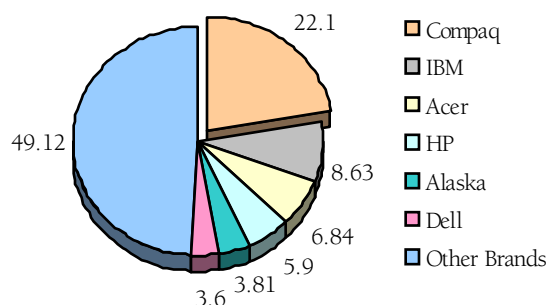
Year	Sales (US$ in million)
1999	4.60
2000	5.63
2001E	6.52
2002P	7.56
2003P	8.79

The four largest imported PC brands namely Compaq, IBM, Hewlett-Packard and Acer accounted for 42% of total sales in 1999, as against 47.3% during the previous year. Compaq was the clear winner in the top six IT markets during the third quarter of 1999, with an 18% share. Compaq met with considerable success in Mexico by way of price cuts and implementation of strategies for individual customer segments with greater focus on the home segment.

Leading Players in Latin American PC Market: 1999

	Units in 000'	% Share
Compaq	1,016	22.10
IBM	397	8.63
Acer	314	6.84
HP	271	5.90
Alaska	175	3.81
Dell	165	3.60
Other Brands	2,258	49.12
Total	4,596	100.00%

Mexico

Mexico is the fastest-growing market for computer equipment in Latin America. However, the industry faces serious obstacles in the form of low disposable income of a majority of the population. Computer penetration stands at a mere 5% compared to 50% in the US. In 1998, Mexico's computer equipment sales totaled $2.2 billion. Small- and medium-size businesses and households led strong growth in the indust ry. Growth in the market is attributed to an increased number of credit plans offered by companies such as Compaq Computer Corp, Acer Inc and Telefonos de Mexico.

EUROPE

France: World's #4 in PCs

France is the fourth largest PC market worldwide and the second largest in Europe. Similar to other Western nations, the market has been receptive to new technologies, particularly Internet-based ones. Growth in this segment is driven by several factors, which include

- An encouraging economic scenario, with low inflation rate of around 2 percent.
- Investments in computer equipment by several IT companies after long years of planning
- Shorter technological cycles resulting in faster adoption of new technologies.

Major Players in the Arena

IBM, Bull, Compaq-Digital and Hewlett-Packard dominate the French PC market, followed by a host of other local and foreign players.

Leading PC Manufacturers in France: 1999

Rank	Company	Market Shares
1	Compaq	13.1
2	Hewlett-Packard	10.2
3	IBM	9.3
4	Apple	6.2
5	ZDS	5.5
6	Packard Bell	5.1
7	Toshiba	4.4
8	Dell	3.8
9	Olivetti	3.3
10	SNI	2.5

Germany

Notebook PCs Hold Sizeable Market Chunk

German PC market was worth DM15 billion in 1999, witnessing an increase of 9.3% compared to 1998. Approximately 30% of overall sales were accounted for by notebook PCs.

Italy

Higher Notebook Sales Propel Growth

Acer ranked the top selling PC brand in Italy, ahead of Compaq that remained the numero uno for over 3 years. The achievement was largely aided by increased notebook sales. Acer branded notebooks ranked the second highest selling brand in Asia Pacific with nearly 15% share of the market next only to IBM. In the fourth quarter of 2000, the Acer brand nudged its way through archrival Compaq to attain the number one position in Italy.

SERVERS

Slowdown in worldwide IT spending did not hamper sales of server systems, which continued to boom through the lean period. Global shipments of servers posted a strong 14% growth in 2000 compared to the previous year. Compaq Computer led the market in 2000, whereas Sun Microsystems and Dell Computer emerged as the fastest growing with shipments growing by 62% and 42% respectively. Compaq Computers led the server market with 27% of total units shipped in 2000. IBM followed with 17% with Dell at 15%. Hewlett Packard with 11% and Sun Microsystems with 7% were the other market leaders.

Global market for servers is witnessing a phase of transition in basic categories with dynamic changes in platforms as well as hardware. Six major players dominate the market accounting for more than 90% share.

- While Unix based servers still hold significant share, Windows NT servers dominated the market with faster growth over the last two years.

- Servers providing cross platform compatibility are in greater demand as compared to single platform systems.

- Linux compatibility is becoming a key determinant in purchase decisions of customers since it provides reliability of Unix and user-friendliness of NT at minimal costs.

- HP has been losing share to rival Sun Microsystems in its core Unix based servers business. HP is contemplating a strategy to recapture lost ground from Sun due to near stagnant growth in the Unix business.

- Emerging Internet applications and e-commerce are touted as the biggest factors triggering growth in servers market.

- Overall, Sun is emerging as the leader in the server segment with dominant shares in both platforms and top of mind systems.

Entry Level Servers: Market Dynamics

Market for entry-level servers is expected to grow by 22% per annum until 2004 making it the fastest growing sub-segment

- Within the entry level segment, Intel based servers with prices under $25,000 are growing at more than 25% and are expected to contribute more than 50% of sub-segment revenues. Primary factor triggering this growth is the increasing number of LAN installations worldwide

- Compaq leads the market by a huge margin over rivals in the entry-level server market. Other leading players include Dell, IBM, HP and NEC.

Midrange Servers

Highlights

- Less established players were affected adversely by increasing competition.

- Players with niche product lines in the server segment such as Tandem, Axil, Digital, Netpower and Stratus, now face stiff competition from established players.

- Concentrating on the Windows NT platform cost HP heavily in the mid range server market.

- Compaq derives over 50% of its revenues from Unix and NT servers.

Strategies of Top Midrange Server Vendors

Dell - Committed to NT

- HP - Phase out the current PA-RISC line to include Itanium based architecture

- Sun - Committed to its own Unix/RISC line and shift to Itanium if demanded by top customer

- IBM - Channeling mainframe technology further down the line and developing add-on technologies
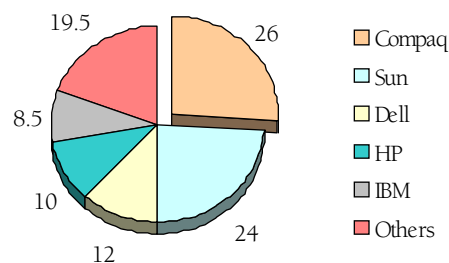
Web Servers

Compaq and Sun Dominate the Market…

Web servers market was clearly dominated by Compaq and Sun as of second quarter 1999. HP and IBM, leaders in other server markets, were ranked fourth and fifth respectively. Sun accounted for 24.0% of the market while market leader Compaq garnered 26.0% share.

Leading Vendors of Web Servers: 1999Q2

Vendors	Market Share (%)
Compaq	26.0
Sun	24.0
Dell	12.0
HP	10.0
IBM	8.5
Others	19.5

PC Servers

Trends in the Servers Market

Server Wars Intensify with IBM's 'Reinvention' of Unix Machines

Servers market witnessed slew of launches in the high-end segment in late 1999 and early 2000. Leading the bandwagon was IBM Corp with its RS/6000 S80 Unix server line. IBM's new offering is directly targeted at HP's V class server line and Sun Microsystems' E10000 range. However, IBM has a tough task ahead of establishing credentials against HP and Sun, the leaders in Unix business.

Eight-Way Servers Seize Big Chunk of High-End Market

Dell, HP, Compaq and IBM all introduced the highly touted eight way servers in late 1999. Demand for these servers forced all major vendors to jump into the market with more powerful, faster, reliable and flexible offering with the Intel profusion chipset and eight 32-bit Pentium III Xeon processors.

Burgeoning demand for eight way servers has led to the opening up of new options for end-users. This led to the development of innovative applications such as data warehousing, e-commerce and ERP demand servers that have zero down time and the capability to handle the entire computing traffic. Microsoft, in a bid to make inroads into Unix's stronghold, is heavily promoting Intel based servers. However, server performance is optimized only with Windows 2000 platform released in early 2000.

Competition was kick-started by Dell, which is trying to replicate its direct business model for lower end versions. Compaq, with its Proliant series, is banking on flexible upgrades of its systems. Meantime, HP is carrying its Unix heritage into the machines and is highlighting advantages of uptime and reliability associated with the platform. IBM's Netfinity range makes use of technologies used in mid range and mainframe products, giving them a distinct image.

WORKSTATIONS

Trends in the Global Workstation Market

- NT Personal Workstations were the most popular products in the global workstation market
- Decline in Unix-based workstation sales is expected to result in a general market slowdown
- Competition in this segment is likely to intensify in the next couple of years, following entry of new players into the market.

STORAGE PRODUCTS

EBC, IBM and Compaq Vie for the Top Honors

EMC, IBM and Compaq shared the top honors in this technology-driven market in 1999. Dell announced plans to step up its marketing efforts in this segment so as to feature among the leading players within the next three years.

Global Rankings of Windows NT Storage Vendors: 1999

Rank	Supplier
1	Compaq
2	Digital Equipment
3	Dell
4	Hewlett-Packard
5	EMC Corp.

IC DEVICES

Texas Instruments leads the IC devices market holding an 80% share. However, introduction of low-priced products by two Taiwanese companies - Realtek Semiconductor Corp and Acer Laboratories Inc. - is expected to change the industry structure.

COMPETITIVE ANALYSIS

ACER - A COMPETITIVE ASSESSMENT

The company's brand strategy, broad and deep product portfolio, and extensive customer base imparts a distinct competitive edge over other players. Reflecting its strategy of consolidating a varied umbrella of operations into focused units, Acer's latest phase of restructuring helps counter competition amidst difficult industry conditions. In addition the company privatized ACI (Acer Computer International), its SES Main Board listed subsidiary, now operating as a wholly owned subsidiary. This move is expected to help the company in consolidating its resources and technical know-how to optimize efficiencies. Highly integrated value chain encompassing product development, manufacturing and sales to services and customer support will help Acer stay ahead of competition.

Acer plans to operate on the forefront of cutting-edge technologies offering innovative products and services to meet ever-changing needs of a dynamic end-user base. The company's notebook computers are competitively priced and well placed in the market in terms of both price and technology. Acer is also teaming up with other companies in the IT industry impart a strategic competitive advantage and are in sync with the company's goals and objectives. Acer formed a global strategic alliance with Solectron in 1999 to provide better solutions and superior technology to customers.

In order to slim its bloated operations and shed the loss-making semiconductor business, the company divested 30% stake in Acer Semiconductor Manufacturing Inc to TSMC. The move facilitates complete focus on strengthening competitive advantages and developing state-of-the-art products. The company's ability to provide high quality customer support stands out as a formidable strength against competitors.

COMPETITION IN PC INDUSTRY

The computer industry is characterized by intense competition amongst companies of various national origins. The market witnesses swift technological changes in hardware as well as software, resulting in a slew of product launches and product upgrades. Major competitive factors in the PC market include price, product performance, product quality and dependability, customer service and support and distribution channels.

Shipments and Market Share of Leading Desktop PC Vendors Worldwide: 2000 (Units in '000s)

Company	% Share	Units
Compaq	13.0%	13,178
Dell	11.0%	11,150
Hewlett-Packard	9.0%	9,123
IBM	5.5%	5,575
Fujitsu Siemens	4.5%	4,561
Gateway	4.5%	4,561
NEC	3.5%	3,548
Apple	3.0%	3,041
Acer	3.0%	3,041
Legend	2.0%	2,027
eMachines	1.5%	1,520
Samsung	1.3%	1,318
Trigem	0.5%	507
Founder	0.5%	507
Others	37.3%	37,810
Total	100.1%	101,467

Shipments and Market Share of Leading PC Vendors in the US: 2000 (Units in '000s)

Company	% Share	Units
Dell	20.0%	9,681
Compaq	16.0%	7,745
Hewlett-Packard	11.5%	5,567
Gateway	9.0%	4,357
IBM	5.5%	2,662
Apple	4.0%	1,936
eMachines	3.0%	1,452
Toshiba	2.5%	1,210
Acer	2.5%	1,210
Micron	1.5%	726
Sony	1.5%	726
NEC	1.0%	484
DTK	0.5%	242
CompUSA	0.5%	242
Others	21.0%	10,165
Total	100.0%	48,406

COMPETITOR ASSESSMENT MATRIX - I

Companies	Acer Group	Compaq	IBM
Base Country :	Taiwan	USA	USA
2000 Sales :	NT$102.75 billion	$23.86 billion (9 months ended)	$87.84 billion
Rank:	Leading PC Producer Leads in Mobile Computers and Network Servers	#1 PC Business	#1 Computer Hardware #2 Computer Software
Core Products :	PCs, notebooks, mobile computers, desktops, peripherals, servers, multimedia display products, digital storage & input devices, Internet devices and motherboards.	Desktops, portables, mini-towers, printers, mainframes, servers, business-critical solutions, workstations, Internet products, networking and communication tools.	PCs, notebooks, mainframes, network servers, software development, information techchnology services, computer components, Internet services, workstations, e-commerce solutions & semiconductors.
Key brands :	Acer, Aspire, AcerPower, Acer Entra, Extensa, Travel-Mate, AcerAltos, AcerPro-Station, AcerScan & Panther.	Compaq, Compaq Storage-Works, ProLiant, Non-Stop, Vista, Armada, Prosignia, TaskSmart, Presario & Alpha.	Aptiva, Netfinity, PC 300, Intellistation, ThinkPad, Crayola and Edmark,
Focus :	Internet services, application Software, IP & digital services.	Internet Products	Internet Products
Major Competitors	: Compaq, IBM, HP and Dell	HP, Dell, Sun, IBM, Acer	Dell, Sun Microsystems, HP, Compaq, IBM and Acer
Geographic Reach	North America, Europe, : Latin America and Asia.	Operates in more than 100 countries worldwide.	Americas, Europe, Middle East and Asia Pacific.
Growth Strategies	Client-Server Organizational structure : & Fast-food business model.	DirectPlus program, a direct selling strategy to market PCs.	Promote IBM technology to different vendors.

COMPETITOR ASSESSMENT MATRIX - II

Companies:		HP	Dell
Base Country	:	USA	USA
2000 Sales	:	$48.78 billion	$25.26 billion
Rank	:	#1 Printers & Imaging #2 Computer Hardware #1 global personal workstation producer	#1 Direct-sale computer vendor, worldwide #2 global desktop producer
Core Products	:	Computers, peripherals, scanners, print- ERs, servers, workstations, network inter- connect products, Internet software, electronic components, storage and imaging products, copiers and mopiers.	Personal computers, notebook computers, network servers, workstation products and peripherals.
Key Brands	:	HP, HP SureStore DLT, SureStore E Eliptica.	Dimension, OptiPlex, Lattitude, Inspiron, PowerEdge and PowerVault.
Focus	:	Notebook computers and Internet devices.	Advanced servers & storage equipment.
Major Competitors	:	IBM, SUN Microsystems, Compaq, Dell, Toshiba & Xerox.	Compaq, IBM, Gateway and Hewlett-Packard
Geographic Reach	:	Americas, Asia-Pacific and Europe.	Americas, Europe, Asia-Pacific and Japan.
Growth Strategy	:	Highly efficient Reseller strategy to restrain manufacturing costs and maintain high efficiency.	Extremely successful direct sales model. Total Cost of Ownership strategy to establish itself in the enterprise market.

ACER GROUP - OPERATIONS

Member Companies	Operations
Acer Information Products Group (AIG)	
Acer Inc.	Manufacture of computer systems, components and consumer electronic products
Acer America Corp. (AAC)	Marketing and assembly of Acer products in North America
Acer Netxus, Inc. (ANI)	Design and production of LAN/WAN products
Acer Europe B.V. (AEB)	Marketing and assembly of Acer brand products in Europe
AOpen, Inc.	Design and manufacture of computer components such as housings, motherboards, optical devices and multimedia products.
Acer NeWeb (ANW)	Manufacture of wireless communication equipment
Acer Softech (ASF)	Design and sale of software products
Member Companies	Operations
Acer Peripherals Group (APG)	
Acer Peripherals Inc. (API)	Design, manufacture and sale of CD-ROM and CD-RW drives, cell phones, CRT and LCD
(Renamed as Acer Communications & Multimedia)	monitors, photo printers, projectors and scanners
Acer Media Technology (AMT)	Design, manufacture, and sale of rewritable media products for optical storage
Acer Display Technology (ADT)	Design, manufacture, and sale of TFT LCD panels and plasma display panels
Darfon Electronics Corp. (DFE)	Design and manufacture of ceramic capacitors, flyback transformers, keyboards and spindle motors
Acer Sertek Service Group (ASSG)	
Acer Sertek (ASI)	Assembly, marketing and sale of Acer products in Taiwan
Acer Market Services (AMS)	Assembly, marketing, and sale of Acer brand products in Mainland China
Weblink	Channel management for software products
CAA Online	Joint venture between Acer and Computer Associates to promote ACCPAC Software in Asia-Pacific Region
Vision Tech	Joint venture between Acer and Computer Associates (CA) for distribution of TNG Unicenter in Asia Pacific.

ACER GROUP - OPERATIONS

Member Companies	Operations
Acer International Services Group (AISG)	
Acer Computer International (ACI)	Assembly, marketing and sale of Acer products in Africa, Asia Pacific, Australia and Middle East.
AASoft	Software distribution
Servex	Distribution of hardware components and PC accessories
Acer Digital Services Group (ADSG)	
Acer Digital Services Corporation	Holding company of ADSG
Acer Internet Services (AcerNet)	Operates Acer's technology entertainment services website and Internet shopping mall
Hi-Trust	Offers Internet Certification and Authentication, and payment gateway services
Tornado	Offers double-byte search engine and search services with user-friendly chat capability
Silicon Valley Journals and YouCool	Offers recruitment services to the Chinese high-tech community
InterServ	Develops and markets children education software services
Lee and Lee	Operates a virtual Chinese cultural museum
PAGIC.net	Offers ISP and telecom services to corporate and individual customers
SunCity	Specializes in Internet alumni and interest group management
Web Point	Develops X-media for media display used in convenience chain stores
Acer SoftCapital Group (ASCG)	

Acer SoftCapital Inc, Acer Capital Corp, Acer Venture Management Inc, Acer Technology Venture Management, HonHo Consulting Co Ltd.

PRODUCT LAUNCHES

Company	Product	Features
2001		
Acer	Warplink	A radio-based networking computer system that interconnects systems providing data transmission rates of upto 11 Mbps within 100 meters. Warplink PCMCIA Card is expected to cost about DM350 and the WarplinkAccess Point (connecting standalones to the network) is expected to cost DM 1,000
Acer India	AcePower Sx	A commercial desktop model featuring Windows ME and available in two price ranges
Acer	TravelMate 350 notebook	Acer introduced PCs and notebooks with built-in smart card readers in the Philippines. Acer's TravelMate 350 notebook features integrated smart card and security software making unauthorized access impossible. The system also allows encrypting and decrypting of files stored in the system.
Acer India	Veriton™ 7100 & Veriton™ 5100	Features Intel Pentium® III Processor; Intel 815E Chipset with embedded audio; 4 USB ports; Hot swappable CDROM, FDD or DVD and FPD Monitor
2000		
Acer Labs	CyberBlade Aladdin i1 Chip Set	A new chip set designed for the notebook PC market. The chip set features a graphics core developed by Trident Microsystems. The chip set incorporates M1632M north-bridge and M1535D south-bridge devices.
Acer	P80 GSM Smartphone	A new 900/1800 dual-band WAP-enabled model. The smartphone enables sending and receiving of faxes, and e-mails, provides PDA facilities that recognize voice and handwriting and synchronizes with PC.
Acer America	Range of non-PC Internet Products	Acer unveiled a range of non-PC Internet appliances developed using the latest Internet technology. The product range includes media-rich entertainment applications to hand-held devices. The release marked Acer's entry into the Internet appliance (IA) market New e-Acer products released include Acer I-Station, Cyber TV, Slimmate PDA and Web Pad. I-Station comes with a web-friendly keyboard with short-cut keys for e-mail, home etc and an external indicator for receipt of new e-mails. The device initially uses a 56Kbps modem with future releases featuring DSL and cable modem access.

PRODUCT LAUNCHES

Company	Product	Features
2000		
Acer	Scan Premio ST High-End Scanner	Acer released the Scan Premio ST high-end scanner into the market. The scanner delivers an optical resolution of 1,200 x 2,400 dpi and 36-bit color scanning. The scanner is designed to simultaneously scan both PCs and Macs.
Acer	Multimedia Notebook TravelMate 505 Series	433Mbz Intel Celeron processor, 64MB RAM 5Gbyte hard disk and 24-speed CD-ROM drive; Integrated 56 Kbit/second mode, and peripheral accessories such as USB port.
Acer	TravelMate 342T Mobile Computer	Intel Pentium III 500MHz processor 64 Mbytes memory, 9 GB Hard Disk Space 12.1-inch TFT display with an attached Web-Cam, enabling usage of the product for videoconferencing
Acer	Veriton FP2 Desktop PC	Operates on Pentium III processor and features a 17" TFT LCD low-emission FPD screen
Acer	TravelMate 600 Series	Powered by the Intel mobile Pentium III processors and Intel SpeedStep technology Provides handling of commercial tasks, connectivity-intensive computing and media performance
Acer	Laboratories1394 Chip	Lowest-power Open Host Controller Interface Link Layer chip in the market Supports 100-, 200-, and 400-Mbit/s 1394 transfer rates and 66-MHz PCI clocks
Acer Inc.	WT 300	200Mhz Cyrix Media GX LV processor 32 MB or 64 MB RAM 10/100BaseT Ethernet capacity Optional smart-card reader

STRATEGIC DEVELOPMENTS

AGREEMENTS

Companies	Purpose	Strategic Significance
2001		
Acer/ATI	To provide customers with ATI's graphics solutions	Solutions include optimized software drivers for the Internet, reference designs and service support designed specially for hardware system integrators and distributors worldwide.
Acer/Palm Inc	Licensed Palm Operating System through 2005	The platform will be the base on which the company delivers its first mobile device. As an extension to the agreement, the company plans to deliver Chinese versions of the platform for the Asia-Pacific region in unison with Palm.
Acer/Quintalinux	Marketing arrangement to distribute Acer-brand systems with the web-enabling groupware, iOffice 2000	Acer's computers will carry a licensed version of iOffice 2000 from Quintalinux's subsidiary that holds the distribution rights, JEXT Limited.
Apacer/SST	To create chip-based digital memory Solutions	Apacer, the company's memory module manufacturer, in collaboration with Silicon Storage Technology will launch the ATA-Disk Chip primarily targeted at the Internet appliance market
Acer Labs/Via Technologies	To manufacture Double Data Rate (DDR) SDRAM for Intel's Pentium 4 microprocessor	Part of the OEM arrangement with Intel
Acer Labs/	To develop double-rate SDRAM-enabled Trident Microsystems integrated chipsets for Notebooks	Named CyberMagik and CyberAladdin, the former is designed for AMD microprocessors while the latter is for the Intel microprocessor. The company's SDRAM technology claims to support the 128-bit Blade XP graphics core developed by Trident.

STRATEGIC DEVELOPMENTS

AGREEMENTS

Companies	Purpose	Strategic Significance
2000		
API/Phone.com Inc	License Phone.com's "UP.Browser" microbrowser for use in its new GSM and CDMA phones	Enables API to enter the handset market Allows API's customers to access Internet through a wireless connection. Acer aims to target the rapidly rapidly growing Asian mobile subscriptions market, making its phones more competitive against rival products.
Acer/ Kidz.net	To feature Kidz.net product in Acer's Systems	Acer Aspire PC will be installed with the Kidz.com product. Kidz.com is a highly popular Internet service targeted at kids of kindergarten through year three.
Acer India	Distribution Agreement with Tech Pacific Technology India Pvt Ltd	Tech Pacific Technology (India) Ltd is to act as national distributor of Acer products including Acer Power desktops, Altos servers and TravelMate notebooks. The move aims at capturing a greater market share in India, by enabling a wider reach for the products through Tech Pacific's strong national network. Tech Pacific is the leading distributor of IT products, peripherals, software, networking and other components.
Acer	Supply Agreement with Dell Computer	To provide 40,000 commercial laptops per month to Dell. The OEM agreement overrides Dell's earlier supply arrangement with Acer's local rival Quanta Computer Inc. The agreement signifies increased prominence of Taiwan in general, Acer in particular, for the notebook PCs.
Acer Peripherals	Distribution Agreement with Wellwin Industry Ltd, India	Wellwin Industry is the third distributor of Acer products in India, the other two being Mumbai-based SES Computers and Tech Pacific. Wellwin holds diversified business interests, ranging from instrumentation products, to two-wheeler auto electricals and computer peripherals.
Acer India	Tie-up with Sigma Online	Acer India entered into a tie up agreement with Sigma Online, an Internet service provider (ISP) to offer value added Internet access to Acer customers. The service is initially available in five cities, and later to be expanded to over 60 other cities. Sigma Online is India's first ISP to obtain a private Internet gateway license.
Acer	Outsourcing Agreement with Casio Computer	To manufacture Casio's Cassiopeia Fiva subnotebook computers. Acer is to produce about 3,000 units of the product each month.
Acer	Outsourcing Agreement with AT&T Solutions	AT&T is to design, implement and manage a global Internet Protocol (IP) network. The project involves an investment outlay of US$100 million for Acer. The network enhances the company's e-commerce, global logistics, and customer-service objectives, integrating six networks spread across the globe into one consolidated internet protocol infrastructure. It also addresses the strategic importance of channeling flow and quality of international communication. By leveraging AT&T's expertise in the field of global networking communications, Acer aims to pep up quality and efficiency of operations by ensuring smooth flow of internal & external communications.
1999		
Acer America Corp/ Deltathree.com Inc.	An e-commerce integration agreement that enables customers to contact Acer's sales department through the Internet	Improves Acer's customer relationship and allows customers to gain easier access to the sales department
Acer Inc & National Semiconductor	To co-develop designs for future set-top box applications	Enables state-of-the-art designs optimized for Internet access and entertainment Platforms built to quickly enhance quality entertainment and enable mass Internet access

STRATEGIC DEVELOPMENTS

AGREEMENTS

Companies	Purpose	Strategic Significance
1999		
API/ Motorola Inc.	Manufacture wireless handsets for Motorola on an OEM basis	To boost its wireless handset business
Acer NeWeb/ Widcomm	To produce Widcomm's range of Bluetooth enabled modules Jointly develop Bluetooth-based products such as adapters and modules	To gain stronger foothold in mobile PC business
Acer Group/IBM (7 year, $8 Billion Pact)	Purchase IBM's microelectronics, hard disk drives, networking & display technology for desktops, notebooks & servers Market IBM's technology through its distribution network	Helps the two companies to offer advanced technology products to customers in the PC market
Acer Inc./ Solectron	Provide advanced technologies and custom solutions custom solutions to the worldwide desktop, workstations & servers market Expand the alliance in other products such as laptops and new generation Internet appliances	Enhance presence in the high growth Internet appliances market
Acer Group/ Cisco Systems	Promote Cisco's Internet Protocol TelephonySolutions in Taiwan	Provides competitive advantage to its corporate clientele
	Jointly develop and sell Data Voice Video Integration (DVVI) based multiservice networking solutions	Expands Acer's Internet business
Acer Peripherals Inc./NEC Corp.	Manufacture 900-MHz GSM handsets onan OEM basis	
Acer Inc./Quantum Corp.	Develop digital storage devices, DVD drives and digital homeapplication products	Strengthens Acer's peripherals business Facilitates development of advanced technology for digital products
Acer Semiconductor Mfg Inc./ Fujitsu Ltd.	ASMI will supply 10,000 DRAM wafers per month, while Fujitsu will supply 0.2 & 0.22 micron DRAM fabrication technology to ASMI	ASMI will establish a long-term co-operative relationship with Fujitsu
Acer Computer Intl/ Thakral Computer & Unison Technologies Acer Laboratories/ ArtX Inc.	Thakral Computers appointed as a national distributor & Unison a regional distributor in North India Offer core logic chip sets for the Socket PC market	Enhance Acer's market share in India

CONTRACTS

Year	Details
2001	The company received an order from IBM for 700,000 notebooks. Delivery is expected to begin between July 2001 and April 2002. The company is also expected to begin production of notebooks for Dell from July 2001 for about 20,000 to 30,000 units.
2000	Acer Softech Inc., the software unit of Acer Inc., chose TRADOS' Translation Memory solution for its ongoing localization process. The solution was implemented in the company's Shanghai production center to aid existing translations, reduce cycle time and improve quality and consistency of localized products.
	The company awarded a seven-year contract to AT&T solutions for designing, building and managing a state-of-the-art global Internet Protocol (IP) network. The deal integrates benefits of IP and advanced networking technologies for the Acer Global Network and also offers global networking management over Acer's information technology infrastructure.

CONTRACTS

Year	Details
1999	Fujitsu Ltd and Acer Inc chose ATI Technologies' graphics products for installation in their new PC range. Products include XPERT 128, XPERT 2000, and XPERT99 graphics and video add-in boards.
	Acer Australia was awarded a contract to supply notebook and desktop PCs valued at US$51.84 million, to Telstra Corp. This pact is a constituent of a three-way contract between Toshiba, IBM, Ipex and Telstra.
	Acer was awarded a contract to supply a wide range of computers and hardware components to Russia's Anti-Monopoly Policy and Private Business Support Committee. As per the contract, the Russian Committee received 420 AcerPower 6200 workstations, 440 AcerView 57c monitors, 20 AcerAltos 500 servers, 10 AcerExtensa 501T notebooks, network equipment, printers, software and several computer accessories.
	Acer NeWeb Corp. received an OEM order from Aiwa to manufacture 10,000 low-noise blocks per month. Low-noise block are basically used in satellite receivers to transmute satellite signals into lower frequency signals.

MERGERS & ACQUISITIONS

Acquirer	Target/Merging Companies	Objectives/Other Details
2001	Acer Display Technologies and Unipac Optoelectronics Corp.	The merger aided by an equity swap brings into existence a new venture, AU Optronics Corporation that will manufacture TFT – LCD display panels. The company's affiliate, Acer Display Technology is expected to derive synergies such as enhanced R&D capabilities among others. The venture is to manufacture 170,000 units of 3.5-generation TFT-LCDs a month. Acer and Unipac's parent company, UMC, are expected to retain a 20% stake each in the new venture.
2000	Acer Semiconductor Manufacturing TSMC Company	Acer entered into a deal with the joint venture partner Taiwan Semiconductor Manufacturing Company (TSMC), the world's leading made-to-order chip manufacturer. As per the terms of the deal, TSMC is to assume full control of the 30% joint venture with Acer, named TSMC-Acer Semiconductor Manufacturing, a fabrication plant. Acer currently holds 32% of the venture. The strategic move highlights the need to keep pace with capacity-building exercises undertaken by other Taiwanese chip makers, with a view to capitalize on burgeoning demand for data processing, communications and consumer products. The move is to benefit Acer, which can refocus energies on less-capital intensive avenues such as the Internet and software.
Acer Inc.	Acer Computec Latino America	The acquisition was in accordance with the company's strategy of integrating its global operations and reduce losses while improving efficiency.
1999		
Acer	Minority stakes in Webpoint Co and Sunnet Tech Co - two Internet service companies	To improve its Internet business
Acer Inc.	Pivotal Networking Inc(multifunction access router producer)	To boost the company's networking portfolio Subsequent to the acquisition, Pivotal will be merged with Acer Netxus to develop highly sophisticated LAN & WAN products
Acer Inc.	Outstanding Shares of 63% Owned Acer Computer Intl. for US$88 Million	Reduce costs and number of plants worldwide

DIVESTMENTS

2001

Acer Inc divested 28.6 million shares in a Group company, Acer Display Technology Inc. through May 2001. The divestment resulted in additional cash reserves of about NT$ 290 million.

2000

The company sold major and minority stakes in subsidiaries and affiliate companies including Liberate Technologies Inc USA (100%), Pacific Cellular Corp (1.8%), Aeopen Inc (3.7%) and Acer Display Technology Inc. (1.3%).

NEW PLANTS

Location	Details
2001	
The Philippines	The company invested P30 million in the Subic Bay Freeport region to install production facilities to manufacture desktop computers for export to the US, Europe and other Asian countries. The unit, based in the Philippines, is expected to manufacture about 150,000 units a year with a 95% export target.
2000	
Ciudad Juarez, Mexico	Acer set up a second assembly plant in Mexico in the city of Ciudad Juarez. It was built at an estimated cost of US$30 million. The company, as a part of its capital spending plans of over US$00 million was to invest a further US$40 million in the country.
1999	
Guangdong, Texas, USA	Acer set up a US$50 million desktop PC facility in Guangdong, China with monthly capacity of 200,000 desktop PCs Acer America established a new 60,000 sq ft call center, providing effective, timely world-class services and support for its customers.
Malaysia	Acer Sales and Services Sdn Bhd established showroom at Petronas Twin Towers. All the latest products of the company including Aspire Multimedia PCs, Extensa notebooks, TravelMate mini notebooks, AcerAltos servers, AcerPower Commercial PCs, AcerScan scanners and many more are available at the showroom.

OTHER DEVELOPMENTS

2001

- Acer will use TIBCO Software Inc's suite of e-business infrastructure software to integrate heterogeneous systems and applications spread in 37 countries worldwide. Additionally, TIBCO's technology enables Acer to host an Internet shopping mall, connecting customers, vendors, and partners in real-time for purchase, procurement, service and information delivery. The solution facilitates creation of an end-to-end real-time scalable e-business platform. It includes thee product suites namely TIBCO ActiveEnterprise; TIBCO ActivePortal and TIBCO ActiveExchange. California-based TIBCO Software Inc is a leading provider of fully integrated real-time business solutions.

- Acer Group companies, Apacer and AOpen, the Group's memory module manufacturer and optical devices, motherboard, multimedia products & other housings manufacturer respectively, reported losses owing to the fire breakout. The financial loss was pegged at 25% lower than original estimates at about US$ 3 million.

- The company in a bid to price products more competitively, decided to trim the flab from the distribution channels creating a highly efficient single-tier distribution network. The bid to reduce prices is expected to help the company position products better in the small and medium business segments.

- The company announced plans to launch a range of electronic and non-PC devices such as the PDAs, i-stations and hand-held devices by the end of 2002. The company operates a strong distribution network involving 174 tier-two partners, 122 authorized service providers, 7 distributors and 12 system integrators.

- The company announced plans to lay off about 300 employees in a major cost cutting measure resulting from depressed market conditions. The move follows an earlier initiative where nearly 500 employees were laid off in the Taiwan plant. The company expected to save about $ 20 million in annual operating costs.

OTHER DEVELOPMENTS

2001

◆ The company announced plans to launch a range of electronic and non-PC devices such as the PDAs, i-stations and hand-held devices by the end of 2002. The company operates a strong distribution network involving 174 tier-two partners, 122 authorized service providers, 7 distributors and 12 system integrators.

◆ The company announced plans to open about 1,000 sales outlets in China during 2001 with 500 more in the offing beyond 2001. The company also announced plans to set up spare parts centers across 50 cities in the country.

◆ Acer Display Technology Inc. invested nearly T$38 billion for TFT-LCD (Thin Film Transistor - Liquid Crystal Display) production in Taiwan.

◆ Acer Display Technology Inc. jointly developed PDP (Plasma Display Panels) along with the Taiwan University. Both entities are expected to begin developing a 50-inch PDP by the beginning of the last quarter of the calendar year 2001.

◆ Acer India announced plans to launch a range of domestic PCs in India. Products will be configured to suit specific requirements of the regional market, while remaining international in quality.

◆ Acer Laboratories announced plans to introduce products for the DVD market. The company plans to rollout a new RISC chip and games-emulation-software to enable playing Sony Playstation and PC games on DVD systems. The company is banking on these products to build a strong market in China. Acer intends to build a strong market in China with these products.

◆ Acer announced plans to close its Ahrensburg plant in Germany, one among the eight plants targeted for closure in Europe.

◆ Acer announced plans to introduce Bluetooth devices with assistance from Ericsson and Widcomm. Ericsson is to supply voice and data modules while Widcomm will supply reference designs and related protocol software.

◆ Acer's board of directors intended to buy back the company's shares from the Taiwan Stock Exchange. The decision is backed by an investment of approximately $31.25 million dollars required to buy out the 32 million shares. The rationale underlying the decision is to redistribute the shares amongst the employees thereby boosting their motivation and loyalty

2000

◆ IBM cut short the long-standing relationship with Acer involving the manufacture of Aptiva line of consumer desktop PCs on an OEM basis. The move is a cost-cutting measure by IBM at a time when the PC industry is on a downturn and several OEMs are trimming their reliance on component suppliers and manufacturing partners. IBM, in turn extended a contract manufacturing alliance with SCI Systems Inc.

◆ Acer India announced plans to assemble entry-level PC servers, and later on extend to mid range servers at the Pondicherry-based reconfiguration center, which is currently assembling Acer desktops. Acer India also launched the AcerPower Se, an Intel Celeron-based commercial desktop PC in the Indian market. The company is also preparing for the launch of Acer Aspire home PC.

◆ Acer undertook several strategic initiatives towards strengthening presence in China, which include a manufacturing facility in Guangdong province with a capacity of 200,000 desktop PCs per month. An investment outlay of US$50million also includes two additional plants planned by 2001 and six more facilities in the pipeline.

◆ Acer America disclosed plans to enter the fray of digital CRT monitors with the end of analog display's global reign. According the plan revealed, Acer is to commence the production of digital CRT monitors, using Silicon Image's SiI 901, digital CRT controller chips. The use of SiI 901 would result in enhanced and sharper visuals, stable end-to-end digital displays. The SiI 901 is based on the Digital Visual Interface (DVI) 1.0 specification that enables designing of convenient monitor installations, and control panels.

◆ The company chalked out plans to invest about Rs. 40 crores to set up a manufacturing plant in Pondicherry for setting up new offices in Bangalore & Delhi and manufacturing peripherals. The facility is to be operational by the end of 2000 with the unit focussing on SKD kits and slowly phase over to local vendor development. The company began operations with a view to making the sub-continent a production hub and export the produce to the Middle East.

◆ Acer Broadband Set Top Box incorporated Tvia Streaming Media Processor for Video On Demand, T-Commerce and Internet Access. The processor would be used for the design-in Tvia CyberPro5050 processor in the digital broadband set top box (STB), the CT500W. The new STB platform would help the Internet content and TV programs to be displayed seamlessly and in real time on a standard television. The CT500W is available with Acer's value-added TV interface for easier access to video on demand, email, cyber shopping, secure Telephony and home banking, video and voice mail among several other facilities. The user can have a direct interface with the CT500W with the help of an IR remote controller. In addition, the customer can avail the facility to print coupons and photos through STB's serial ports.

OTHER DEVELOPMENTS

2000

- Acer closed down several existing plants in different parts of the world. The company closed down 17 out of its 30 assembly plants world over, with three units been shut down during the fiscal 2000. Owing to a general slowdown in the PC market, Acer decided to close down at least 12 of its 20 global manufacturing units. Apart from the economic criteria, another important driving force behind the recent spate of closures was the company's decision to relocate its US retail market business.

- Acer Inc launched a global e-commerce system to improve delivery operations and reducing procurement costs. The company invested US$2.30 million to establish the business-to-business (B2B) project with over 200 suppliers and clients gaining access to the system by 2000. The company anticipates over 500 suppliers using the system with transaction volume exceeding US$1.95 million. The system enables suppliers to arrange delivery schedules thereby rendering Acer's supply chain more efficient. The system incorporates the company's "95-5 Plan" – 95% of any customer's order ready for shipment within 5 days.

- Faced with lower margins in the made-to-order original equipment manufacture market and stiff competition in marketing their brands in Europe and the US, Acer expanded operations into the Chinese market. The company intended to develop Internet services as well as selling next-generation Internet appliances (IAs). The move is part of Acer's strategy to create a strong base in Asia for next generation devices.

- The company incurred losses of over US$45 million after its sleek Aspire Home PC took a beating from rival products. The company also faced stiff competition from industry majors such as Dell and Gateway. The latter two companies have a very strong presence in the US market as well as superior marketing, distribution and customer services. Acer's Aspire was mainly sold in the low-margin sectors and therefore could not gain entry into the high margin corporate market.

- Acer appointed American Power Conversion Corp as an exclusive supplier of power protection equipment on the ShopAcer online shopping site. As a part of the deal, American Power's power protection services were to be resold via Acer's e-commerce site in North America.

- Acer integrated InterVideo's Win DVD™ software DVD player in several of its current products including Aspire and AcerPower lines. WinDVD™ is a superior quality DVD software player/decoder with multiple features such as advanced intuitive interface, software window scaling, software and hardware sub-picture alpha blending and software video signal de-interlacing.

KEY EXECUTIVES

Stan Shih, Chairman and CEO (Acer Group) and Acting CEO Acer Semiconductor Group (ASG)

William Lu, Chief Executive Officer Acer International Service Group (AISG)

J.T. Wang, Chief Executive Officer Acer Sertek Service Group (ASSG) and President Acer Group

Simon Lin, Chief Executive Officer Acer Information Products Group (AIPG) and President Acer Group

K.Y. Lee, Chief Executive Officer Acer Peripherals Group (APG)

SUBSIDIARIES

Acer Information Products Group (AIG)
Member Companies:
Acer Inc.
Acer America Corp. (AAC)
Acer Europe B.V. (AEB)
Acer Netxus, Inc. (ANI)
Acer NeWeb (ANW)
Acer Softech (ASF)
AOpen, Inc.

Acer SoftCapital Group (ASCG)
Member Companies:
Acer SoftCapital Inc.
Acer Capital Corp.
Acer Venture Management Inc.
Acer Technology Venture Management
HonHo Consulting Co., Ltd

Acer Sertek Service Group (ASSG)
Member Companies:
Acer Sertek (ASI)
Weblink
Acer Market Services (AMS)
Vision Tech
CAA Online

Acer Peripherals Group (APG)
Member Companies:
Acer Peripherals Inc. (API)
Acer Display Technology (ADT)
Acer Media Technology (AMT)
Darfon Electronics Corp. (DFE)

Acer International Services Group (AISG)
Member Companies:
Acer Computer International (ACI)
Servex
AASoft

Acer Digital Services Group (ADSG)
Member Companies:
Acer Digital Services Corp.
Acer Internet Services (AcerNet)
Hi-Trust
Silicon Valley Journals and YouCool
InterServ
Tornado
SunCity
Lee and Lee
Web Point
PAGIC.net

IT Equipment Markets Worldwide: Annual Projections - 1999-2005 for The US, Canada, Japan, Europe
(Germany, The UK, France, Italy and Rest of Europe), Asia, Latin America and Rest of World (in US$ billion)

Region/Country	1999	2000	2001	2002	2003	2004	2005	CAGR
The US	411.20	449.78	485.94	519.93	551.95	582.04	613.50	6.90
Canada	31.83	33.96	35.92	37.71	39.47	41.01	42.53	4.95
Japan	86.32	95.57	105.57	114.83	124.11	133.79	144.93	9.02
Europe	303.01	327.96	350.78	371.80	391.99	411.60	431.77	6.08
Germany	73.21	79.18	84.27	89.12	93.57	97.96	102.68	5.80
The UK	50.65	53.79	57.10	59.38	62.25	65.13	67.74	4.96
France	48.97	51.86	54.34	56.93	59.27	60.77	62.58	4.17
Italy	35.87	38.68	41.10	43.34	45.42	47.41	49.55	5.53
Rest of Europe	94.30	104.46	113.97	123.04	131.48	140.33	149.22	7.95
Asia	57.65	66.64	75.41	83.74	92.79	102.18	111.85	11.68
Latin America	19.22	21.64	24.18	26.81	29.25	31.47	33.94	9.94
Rest of the World	76.16	75.87	73.44	69.41	64.57	60.37	53.56	-5.70
World	985.39	1071.42	1151.24	1224.23	1294.13	1362.46	1432.08	6.43

Note: *Asia does not include Japan*

World

IT Equipment Markets Worldwide: Growth Rate Projections - 2000-2005 for The US, Canada, Japan, Europe
(Germany, The UK, France, Italy and Rest of Europe), Asia, Latin America and Rest of World (in %)

Region/Country	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005
The US	9.38	8.04	7.00	6.16	5.45	5.41
Canada	6.71	5.76	4.98	4.68	3.90	3.71
Japan	10.72	10.46	8.78	8.08	7.80	8.32
Europe	8.24	6.96	5.99	5.43	5.00	4.90
Germany	8.15	6.43	5.76	4.98	4.70	4.82
The UK	6.19	6.17	3.98	4.84	4.62	4.01
France	5.89	4.79	4.76	4.12	2.52	2.99
Italy	7.83	6.26	5.45	4.81	4.38	4.51
Rest of Europe	10.78	9.10	7.95	6.87	6.73	6.33
Asia	15.61	13.15	11.05	10.81	10.13	9.45
Latin America	12.63	11.71	10.90	9.09	7.61	7.84
Rest of the World	-0.41	-3.17	-5.49	-6.97	-6.53	-11.26
World Total	8.73	7.45	6.34	5.71	5.28	5.11

Note: *Asia does not include Japan*
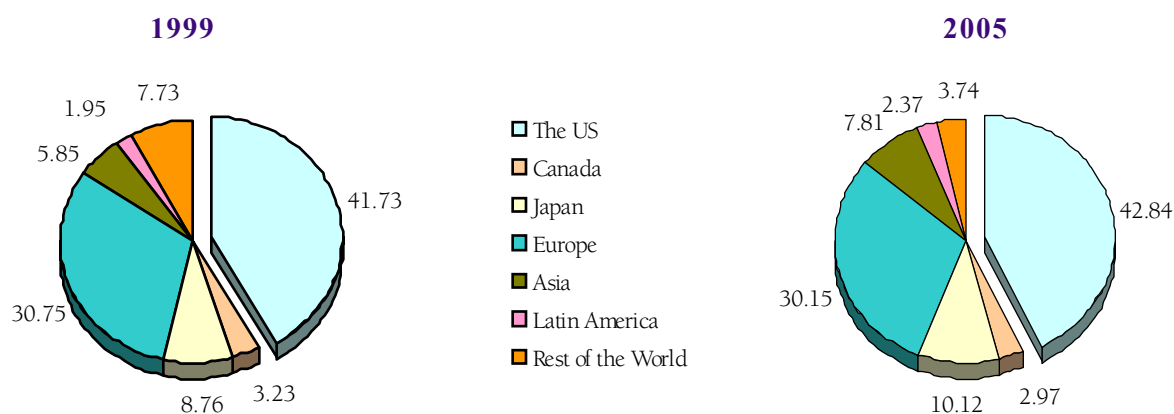
Market Share Trends

◆ United States contributes the largest share to the global IT equipment market, accounting for about 41.73% of the total market. This share is projected to increase to about 43% of the world market by 2005.

◆ Europe is the second largest contributor to the worldwide IT Equipment market, with an estimated share of about 31% in 1999. However, this share is expected to decrease slightly to 30.15% by 2005.

◆ Japan stands third, in terms of market share in the global IT Equipment market, with an estimated share of about 9% in 1999. Japan's share in the worldwide IT Equipment market is projected to grow to 10% by 2005.

IT Equipment Markets Worldwide: Market Share Trends for 1999 and 2005 for The US, Canada, Japan, Europe, Asia, Latin America and Rest of World (in %)

Region/Country	1999	2005	Change
The US	41.73	42.84	1.11
Canada	3.23	2.97	-0.26
Japan	8.76	10.12	1.36
Europe	30.75	30.15	-0.60
Asia	5.85	7.81	1.96
Latin America	1.95	2.37	0.42
Rest of the World	7.73	3.74	-3.99
World	100.00	100.00	

Note: *Asia does not include Japan*

◆ Among the European countries, Germany ranks first in terms of IT Equipment market share, followed by the UK, France and Italy.

◆ Germany's market share, with respect to the European IT Equipment market was estimated at about 24% and with respect to global IT Equipment market was estimated at about 7%, for 1999.

◆ Though, Germany's market size is likely to increase from US$72 billion in 1999 to US$103 billion in 2005, its market share in both European and global markets is projected to decline due to the emergence of new markets in Europe and other regions.

IT Equipment Market in Europe: Market Share Trends for 1999 and 2005 for Germany, The UK, France, Italy and Rest of Europe (in %)

Year	1999		2005	
Country/Region	With Respect to Europe	With Respect to World	With Respect to Europe	With Respect to World
Germany	24.16	7.43	23.78	7.17
The UK	16.72	5.14	15.69	4.73
France	16.16	4.97	14.49	4.37
Italy	11.84	3.64	11.48	3.46
Rest of Europe	31.12	9.57	34.56	10.42
Europe	100.00	30.75	100.00	30.15

1999

2005

Germany
The UK
France
Italy
Rest of Europe

Product Segment Overview
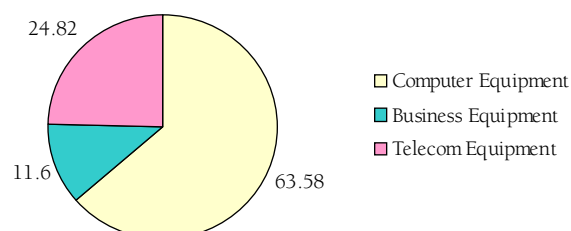
Information Technology Equipment can be categorized into three types viz. Computer Equipment, Business Equipment and Telecom Equipment.

Computer Equipment is the largest sub-segment of the IT Equipment market. This sub-segment was estimated to account for about 63% of the global IT Equipment market in 1999. Telecom Equipment category was estimated to contribute about 25% of the worldwide IT Equipment market in 1999.

Business Equipment sub-segment's share of the global IT equipment revenues was an estimated 12% in 1999.

IT Equipment Market Worldwide: Category-wise Revenue Estimates for 1999 (in US$ billion)

Category	Category Revenue	% of Total IT Equipment
Computer Equipment	626.51	63.58
Business Equipment	114.31	11.60
Telecom Equipment	244.57	24.82
Total IT Equipment	985.39	100.00

Computer Equipment
Business Equipment
Telecom Equipment

Market Share Trends: (By Product Segment)

North America, comprising of both the US and Canada, was estimated to account for about 43%, 47% and 49% of the worldwide Computer Equipment, Business Equipment and Telecom Equipment sub-segments, respectively, in 1999.
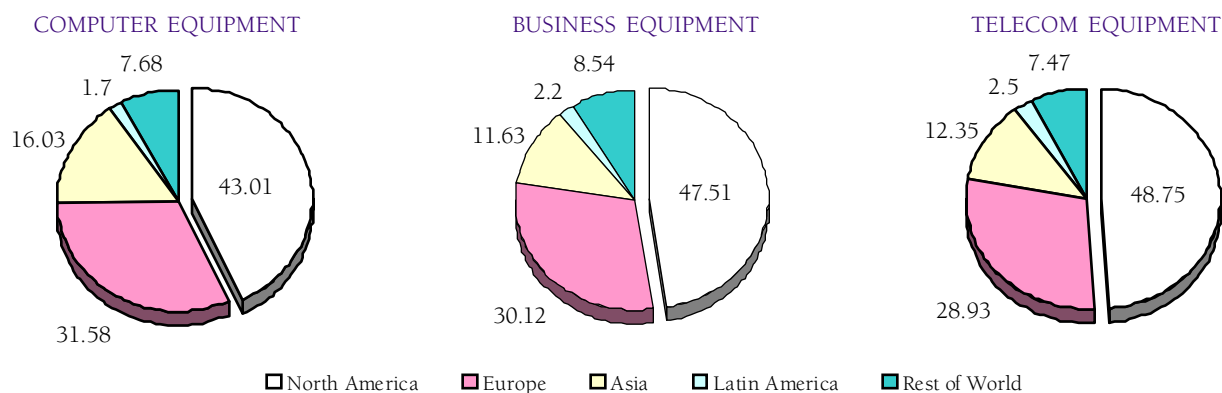
European market was about 31%, 30% and 29% of the global Computer Equipment, Business Equipment and Telecom Equipment sub-segments, respectively, in 1999.

Asia, including Japan, was estimated to account for about 16%, 11% and 12% of the global Computer Equipment, Business Equipment and Telecom Equipment sub-segments, respectively, in 1999.

IT Equipment Market Worldwide: Region-wise Category Break-up of 1999 Revenue Estimates for North America, Europe, Asia, Latin America and Rest of World (in %)

Region	Computer Equipment	Business Equipment	Telecom Equipment
North America	43.01	47.51	48.75
Europe	31.58	30.12	28.93
Asia	16.03	11.63	12.35
Latin America	1.70	2.20	2.50
Rest of World	7.68	8.54	7.47
Total	100.00	100.00	100.00

Note: Asia includes Japan; North America includes USA and Canada

COMPUTER EQUIPMENT

7.68
1.7
16.03
43.01
31.58

BUSINESS EQUIPMENT

8.54
2.2
11.63
47.51
30.12

TELECOM EQUIPMENT

7.47
2.5
12.35
48.75
28.93

☐ North America ☐ Europe ☐ Asia ☐ Latin America ☐ Rest of World

IT Equipment Market Worldwide: Region-wise Category Break-up of 1999 Revenue Estimates for North America, Europe, Asia, Latin America and Rest of World (in US$ billion)

Region	Computer Equipment	Business Equipment	Telecom Equipment	Total
North America	269.46	54.31	119.23	443.00
Europe	197.85	34.43	70.75	303.03
Asia	100.43	13.29	30.21	143.93
Latin America	10.65	2.52	6.11	19.28
Rest of World	48.12	9.76	18.27	76.15
Total	626.51	114.31	244.57	985.39

Note: Asia includes Japan; North America includes USA and Canada
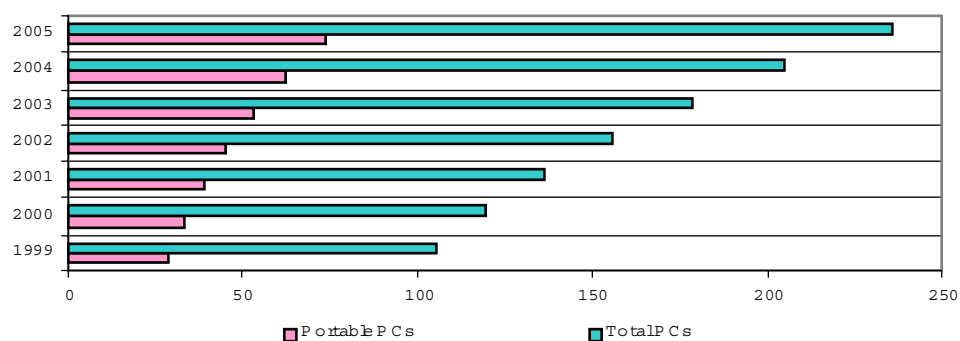
## PORTABLE PERSONAL COMPUTERS

Market Snapshots

- ◆ The global market for Portable Personal Computers (Portable PCs) is estimated at 33.23 million units in 2000. Witnessing a compound annual growth rate of about 17.25%, the market is projected to reach 73.61 million units by 2005.

- ◆ The worldwide market for Personal Computers is estimated at 119.7 million units in 2000 with Portable PCs accounting for 27% of total PCs market. The share of Portable PCs in the total PCs markets will rise to 31% by 2005.

- ◆ US is expected to emerge as a major consumer of Portable PCs, witnessing a compound annual growth rate of about 14.9%. The market is expected to reach 32.39 million units by 2005.

- ◆ Asia-Pacific region is the fastest growing market for Portable PCs. The region is poised to grow at a compound annual growth rate of 22.85%, to reach 13.18 million units by 2005 from an estimated 4.71 million units in 2000.

- ◆ Toshiba Corporation (Japan) is the leading producer of Portable PCs in the World.
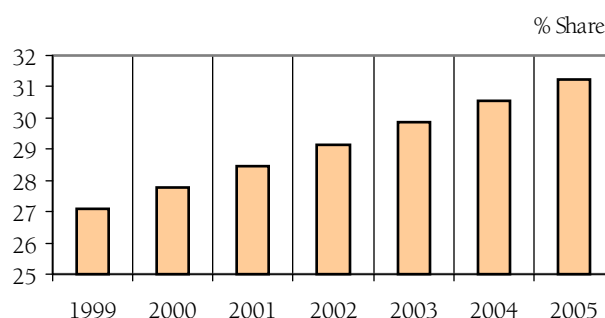
Portable Personal Computer & Personal Computer Market: Worldwide Annual Unit Shipment Estimates/Projections for 1999-2005 (Units in Million)

| Year	1999	2000	2001	2002	2003	2004	2005	CAGR %
Portable PCs	28.5	33.23	38.79	45.37	53.2	62.5	73.61	17.13%
Total PCs	105.30	119.70	136.31	155.65	178.25	204.54	235.86	14.39%
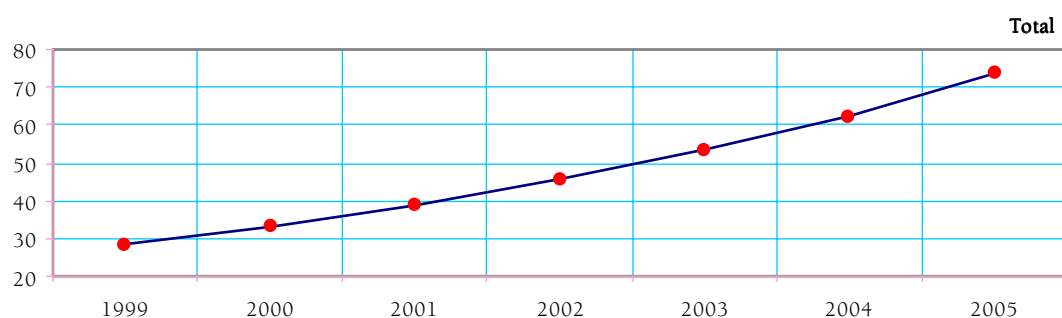
Portable Personal Computer Markets Worldwide: Percentage Share of Portable PCs in the Total PCs Market for 1999-2005 in Unit Shipments (Shares in Percentage)

Year	% Share
1999	27.07
2000	27.76
2001	28.46
2002	29.15
2003	29.85
2004	30.56
2005	31.21

Portable Personal Computer Market Worldwide: Annual Unit Shipment Estimates/Projections for 1999-2005 by Regions such as USA, Canada, Japan, Europe (Germany, France, Italy, Russia, Spain, UK and Rest of Europe), Latin America, Asia-Pacific and Middle East (Units in Million)

Region	1999	2000	2001	2002	2003	2004	2005	CAGR (%)
USA	14.14	16.19	18.56	21.29	24.44	28.1	32.39	14.81
Canada	1.6	1.85	2.12	2.45	2.83	3.27	3.79	15.46
Japan	4.62	5.61	6.8	8.28	10.08	12.27	14.99	21.67
Europe	3.82	4.34	4.91	5.55	6.3	7.17	8.12	13.39
Germany	0.91	1.03	1.16	1.3	1.48	1.67	1.88	12.85
France	0.67	0.74	0.82	0.91	1.01	1.14	1.27	11.25
Italy	0.32	0.37	0.41	0.46	0.51	0.58	0.65	12.54
Russia	0.17	0.18	0.2	0.22	0.23	0.25	0.28	8.67
Spain	0.21	0.25	0.27	0.31	0.36	0.4	0.45	13.54
UK	0.27	0.3	0.35	0.39	0.44	0.5	0.57	13.26
Rest of Europe	1.27	1.47	1.7	1.96	2.27	2.63	3.02	15.53
Latin America	0.31	0.36	0.43	0.5	0.6	0.7	0.8	17.12
Asia-Pacific	3.86	4.71	5.77	7.07	8.68	10.69	13.18	22.71
Middle East	0.15	0.17	0.2	0.23	0.27	0.3	0.34	14.61
Total	28.5	33.23	38.79	45.37	53.2	62.5	73.61	17.13

Total

Portable Personal Computer Markets Worldwide: Key Players by Geographic Area

| Country	Key Players
USA	- Acer American Corporation - Compaq Computer Corporation - IBM - Fujitsu PC Corporation - Gateway 2000 - Dell Computer Corporation - AST Research - Apple Computers Incorporation - Hitachi
Japan	- Toshiba Corporation - Sony Corporation
China	- Legend Electronics Incorporation
Taiwan	- Acer Group - MiTAC International Corporation

NOTEBOOK COMPUTERS
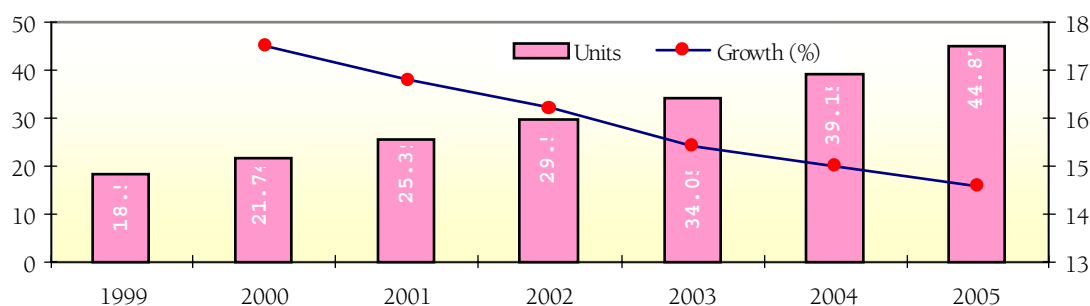
Market Overview

- The United States market for notebook PCs is growing at an annual average rate of 24%. The market size is estimated at 44.8 million units in 2005, an increase of 26.3 million units from the 1999 market.

- Leading Players in the United States notebook computer market include Toshiba, IBM Corp., Compaq, Hewlett Packard, Bell, NEC, Acer, Fujitsu, Dell, Apple, Hitachi, Gateway and Sharp.

- Major factors affecting the market include product cost, product reliability, service & support and reputation of the vendor. All these factors influence the demand for notebook computers.

Notebook Computers Market in the US: Estimates/Projections for 1999 - 2005 (Units in million)

Year	1999	2000	2001	2002	2003	2004	2005
Units	18.5	21.74	25.39	29.50	34.05	39.15	44.87
Growth (%)		17.5	16.8	16.2	15.4	15.0	14.6

Annual Average Growth Rate: 15.91%

PC CHIPSETS MARKET

Industry Overview

PC chipsets are chips that surround and support the central processor in a personal computer. The PC chipset market experienced a decline in 1998 when the sales decreased to $1.7 billion compared to the previous year's figure of $2.3 billion.

Intel Leads the Chipsets Market

Intel produces chipsets that support microprocessors in the PCs. In less than a decade, Intel achieved market leader status, accounting for a share of over 80% in the PC chipset market. Other players such as Acer, Via and Silicon Integrated Systems, contributed about $300 million to the overall PC chipset sales in 1998.

Trends in Chipset Market

Increased Assistance from Direct RDRAM

Intel's Direct RDRAM (Rambus DRAM) architecture supports high-end desktops.

Data can be transferred with extremely high speeds through a narrow bus, using the Direct RDRAM architecture. Pin count can be reduced, but high design complexity is created.

Integration of Graphical Functions onto the Chipset.

Distinct 3D graphic accelerator boards are required for high-performance gaming applications and CAD. 3D graphics are not required by most of the home users and businesses that do not use multimedia. This integration of graphical functions into chipsets brings down the chip count as well as design complexity.

#### *Audio Functions Merged into Chipsets.*
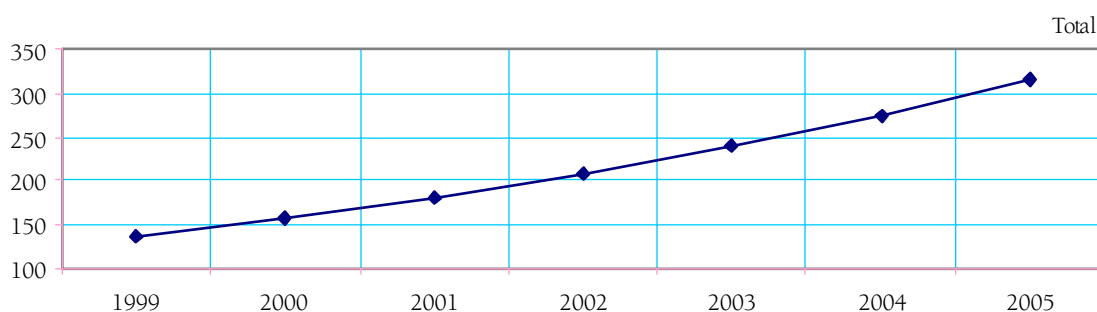
Intel has developed numerous specifications as to how analog and digital components within the audio domain can be divided inside chipset circuitry.

Chipsets Markets Worldwide: Annual Estimates/Projections for 1999-2005 for the United States, Canada, Japan, Europe, Asia-Pacific, the Middle East/Africa and Latin America (Units in million)

Region	1999	2000	2001	2002	2003	2004	2005	CAGR (%)
US	46.97	54.25	62.82	72.83	84.56	98.42	115.06	16.10
Canada	3.83	4.41	5.07	5.83	6.70	7.68	8.80	14.87
Japan	10.06	11.59	13.31	15.25	17.41	19.83	22.56	14.41
Europe	42.50	48.66	55.52	63.21	71.49	80.53	89.51	13.22
Asia-Pacific	19.47	22.56	26.23	30.62	35.84	42.13	49.74	16.92
Middle East/Africa	5.78	6.64	7.61	8.68	9.89	11.24	12.72	14.06
Latin America	7.30	8.42	9.74	11.28	13.08	15.19	17.67	15.87
Total	135.90	156.53	180.30	207.70	238.97	275.02	316.10	15.1
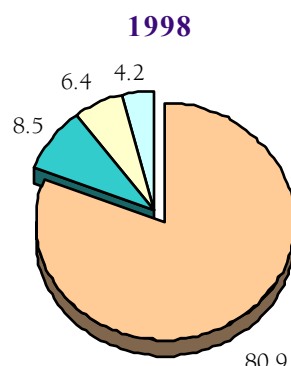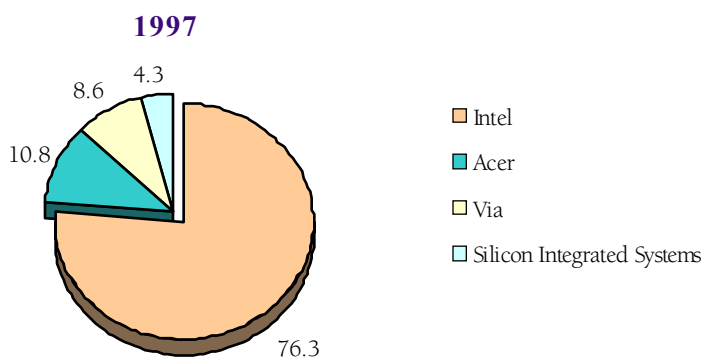
AAGR: Annual Average Growth Rate

1999 GIA Estimates
2000-2005 GIA Projections

Total

Chipsets: Market Share Trends for 1997 & 1998 for 4 Leading Players – Intel, Acer, Via and Silicon Integrated Systems (Sales in million $)

Company	1997	Share (%)	1998	Share (%)	%Change
Intel	1,220	76.30	1,261	80.90	+3.36
Acer	172	10.80	133	8.50	-22.67
Via	138	8.60	100	6.40	-27.54
Silicon Integrated Systems	69	4.30	66	4.20	-4.35
Total	1,599	100.00	1,560	100.00	-2

1997   **1998**

□ Intel
□ Acer
□ Via
□ Silicon Integrated Systems
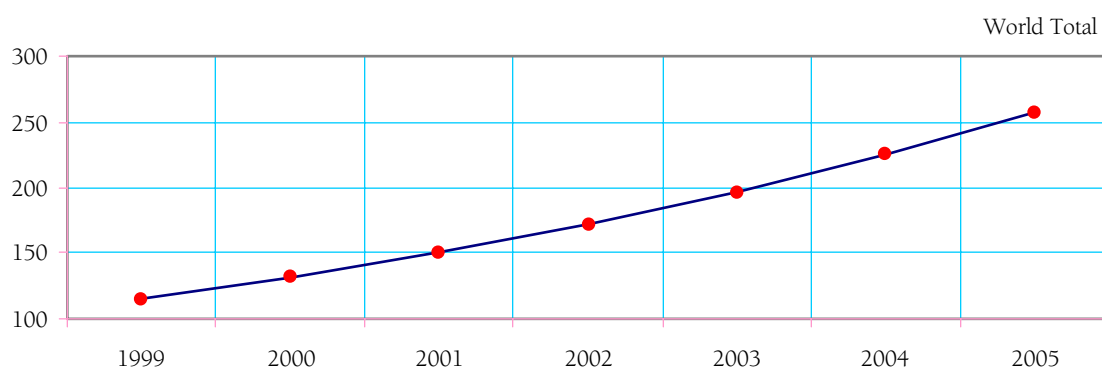
MOTHERBOARDS

Market Snapshots

- Worldwide motherboards market totaled 115.8 million units in 1999. Witnessing an average growth of 14.2% per annum, the market is predicted to cross 250 million units by 2005.

- US is the largest market for motherboards with sales of over 40 million units in 1999, while Asia-Pacific is the fastest growing market at nearly 18.7% per annum.

- Intel dominates the worldwide motherboards market with sales of US$2.4 billion in year 1999, registering an erosion of 20% in   sales as compared to 1998.

- Taiwan is the largest manufacturer of motherboards, accounting for 70% share of the global market in 1998 and an estimated 78.9% share in 1999.

- Production of motherboards in Taiwan reached 83.83 million in 1999, an increase of 33.1% as against 1998.

- Shipments from Taiwan declined in the year 1999, due to Y2K issues and the devastating earthquake that hit the country.

- The motherboard market is analogous to the PC market.

- Despite an increase in volume sales of motherboards, value sales experienced no major change mainly due to declining prices.

- Manufacturers are grappling with component costs and the tedious process of combining audio and graphics on the motherboard.

- Asian currency crisis has made global motherboards market more price-sensitive.

- Motherboard manufacturers in the US face an uphill task in keeping pace with Intel as well as other new technologies.
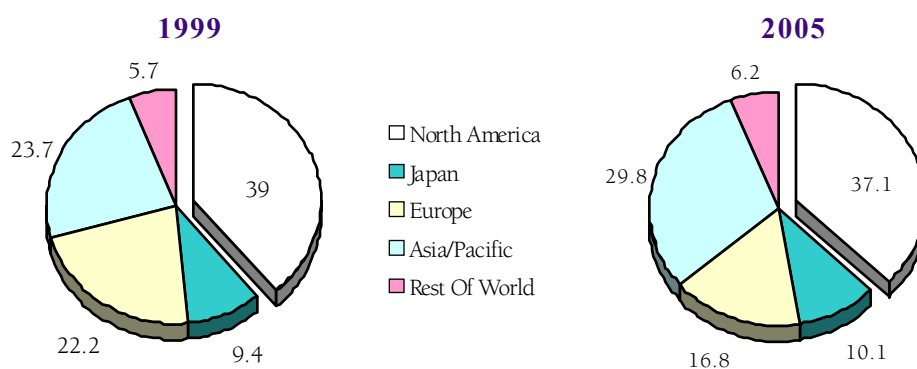
Motherboards Market: Global Estimates/Projections for 1999-2005 By Region – USA, Canada, Japan, Europe, Asia-Pacific, Middle-East and Latin America (Units in millions)

Region	1999	2000	2001	2002	2003	2004	2005	CAGR% (2000-2005)
USA	40.33	45.55	51.49	58.26	66	74.85	84.65	13.2
Canada	4.83	5.52	6.32	7.24	8.29	9.5	10.87	14.51
Japan	10.89	12.48	14.34	16.59	19.27	22.45	25.88	15.7
Europe	25.68	27.98	30.43	33.21	36.32	39.79	43.36	9.16
Asia-Pacific	27.46	32.49	38.51	45.7	54.32	64.66	76.67	18.73
Middle-East	1.26	1.44	1.66	1.9	2.2	2.52	2.89	14.95
Latin America	5.35	6.19	7.17	8.32	9.67	11.22	13	16
World Total	115.8	131.65	149.94	171.21	196.07	224.99	257.33	14.34

World Total
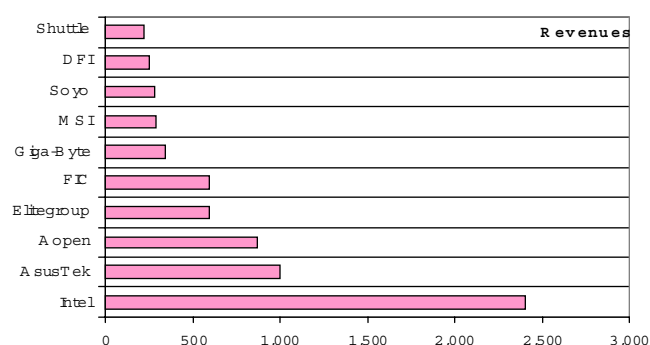
Motherboards Market: Global Percentage Breakdown for 1999 & 2005 By Region, North America, Japan, Europe, Asia-Pacific and Rest of World   (Share In %)

Region	1999	2005
North America	39.0	37.1
Japan	9.4	10.1
Europe	22.2	16.8
Asia/Pacific	23.7	29.8
Rest Of World	5.7	6.2
Total	100.0	100.0

1999

2005

- North America
- Japan
- Europe
- Asia/Pacific
- Rest Of World
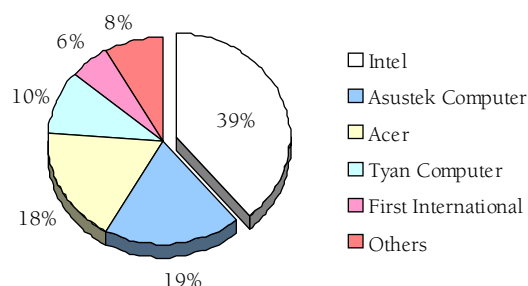
Revenues of Leading Motherboard Manufacturers: 1998 (In US$ Million)

Company	Revenues
Intel	2,400
AsusTek	1,000
Aopen	870
Elitegroup	600
FIC	600
Giga-Byte	348
MSI	298
Soyo	280
DFI	256
Shuttle	220

Branded Motherboards Used by Resellers: 1998

Company	Usage (%)
Intel	39
Asustek Computer	19
Acer	18
Tyan Computer	10
First International	6
Others	8
Total	100

- Intel
- Asustek Computer
- Acer
- Tyan Computer
- First International
- Others

Industry Briefs

- Advanced Micro Devices in alliance with Wave System Corporation is developing security functions as core component of PC motherboards.
- Soyo rolled out three motherboards designed to increase performance of 1GHz chips from AMD Inc., and Intel Corp.
- Through a joint venture with Staccato Systems and Analog Devices, Scipher introduced the SoundMAX 2 audio solution that eliminates the need for separate sound card to be plugged in.
- Microtronica, in association with Tyan, offers an integrated MicroATX board with Slot 1 for Pentium III processors and built-in support for the latest PC133 memory and UltraDMA/66 hard disk technologies. The board offers proviso for Slot-1 and PGA370, which can be easily integrated with Celeron or Pentium family processors having the same board.
- Soyo launched a range of new motherboards that support next-generation CPUs, chipsets and peripherals. The company launched two boards in association with Via Technologies Inc - Apollo Pro 133 chipset with PC133 memory and 4XAGP graphics.

- Vintron Industries (India) plans to invest Rs.60 million for increasing capacity from 100,000 units to 250,000 units of motherboards. The company is expecting a 50% growth rate following the move.
- Intel filed a suit against First International Computer (FIC) for selling motherboards that incorporate Via chipsets. The company has also sued the UK distributor KM Components for selling FIC boards.

### Factors Considered for Purchasing a Motherboard

- Type of Central Processing Unit
- Type of RAM that supports the motherboard
- Brand of system BIOS used
- Installed cache memory
- BUS types such as ISA (16 bit), EISA (32 bit), VLB (32 bit) & PCI (32s/64 bit)
- Capacity of integration in the motherboard
- Size of motherboard

PURE-PLAY SEMICONDUCTORS
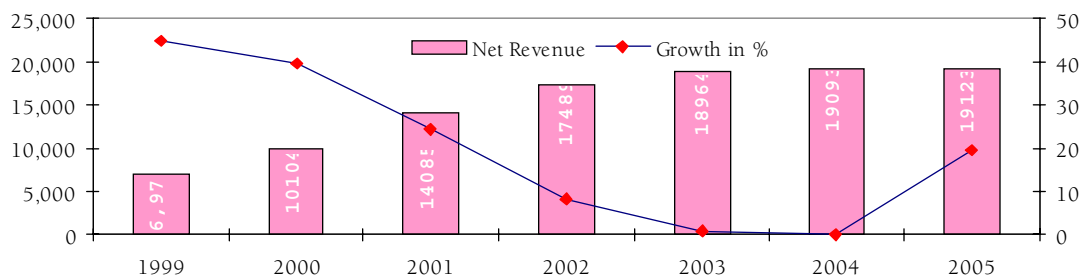
Most foundries or semiconductor contract manufacturers who produce built-to-order chips for their customers are capitalizing on the broad-based in undry industry is estimated to increase by about 20% on an average for the coming five years.

Increasing number of "fabless" chip companies today rely on foundries for building their designs. These companies, which lead the integrated devices sector, include Lucent Technologies, Motorola Inc., Toshiba Corp. and National Semiconductor Corp. These foundries provide them with facilities that will reduce their own expensive new chip lab expenses.

Currently, about 6% of the global semiconductor sales (US$6.9 billion) are accounted by foundries. Along with wafer testing and packaging revenue, the foundry industry is estimated to increase by about 20% on an average for the coming five years.

Pure-play Semiconductor Market: Worldwide Annual Estimates/Projections for 1999-2005, by Revenue (in $ millions)

|	1999	2000	2001	2002	2003	2004	2005	CAGR% (2000-2006)
Net Revenue	6979	10104	14085	17489	18964	19093	19123	13.61
Growth in %	44.78	39.40	24.17	8.43	0.68	0.16	19.60	
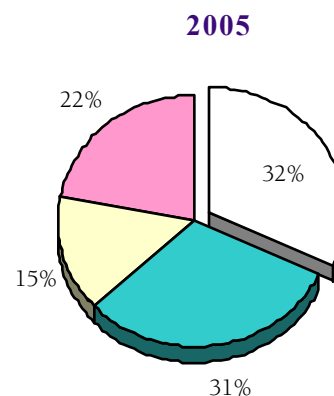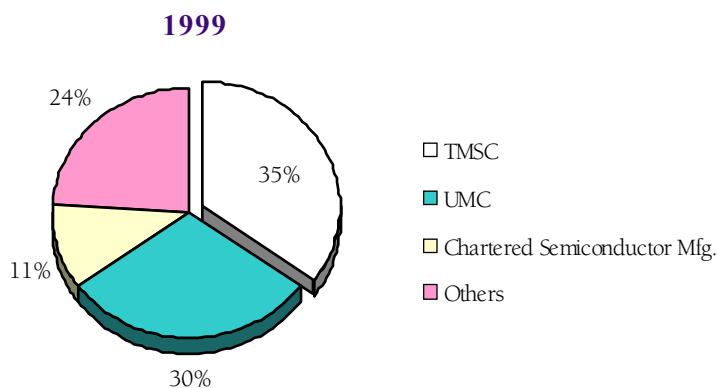
Industry Snapshots

- Three Asian companies (TSMC, UMC and Chartered Semiconductors) lead the pure-play foundry market, accounting for over three-fourth of the total industry's revenue. A handful of integrated device manufacturers including IBM Corp, also provides foundry services. In addition, several recently founded pure-play companies offer these services.

- Chipmakers are finding it increasingly difficult to gain supply of fabless or pure-play semiconductors, with demand increasingly outstripping supply. Large integrated device makers such as Motorola Inc and Toshiba Corp are further provoking this trend, which show almost insufficient demand for these chips. These companies, unable to meet the demand for fabless chips themselves are outsourcing from foundries.

- The most leading integrated device manufacturers to outsource is Motorola Inc., which in early 2000 converted about 35% of its manufacturing to found· All these factors are likely to enable the demand for fabless chips to increase at a pace of 40-50%, annually. In addition, worldwide foundry revenues are estimated to double within the next five years.

- Estimates indicate that even new and hitherto untested companies such as First Silicon and Silterra Malaysia Sdn. Bhd., based in Malaysia have acquired pre-paid customers enough to engage almost full capacity of its facilities.

- In spite of new strategic partnerships in the offing, major players in this market prefer to fund their own growth. TSMC has only one joint venture with Philips Electronics NV and UMC has been converting several of its joint ventures into wholly owned operations by buying out the partners' equity stock. This has also led to windfall gains for several companies in the industry.

- At the same time there also exist frustrated fab companies, which are unable to satiate its excessive demand. By which, these companies have begun production of their own chips. Silicon Integrated Systems Corp. is a prime example of such a company. However, a keen observation into the industry indicates that this trend is more an exception than a rule. Most fab companies find it extremely expensive to produce their own chips.

Pure-play Semiconductor Market, Worldwide: Percentage Breakdown for 1999 & 2005 by Manufacturing Company

	1999	Market Share	2005	Market Share
TMSC	2442.65	35	6119.36	32
UMC	2093.7	30	5928.13	31
Chartered Semiconductor Manufacturing	767.69	11	2868.45	15
Others	1674.96	24	4207.06	22
Total	6979	100	19123	100

1999

2005

- □ TMSC
- ■ UMC
- □ Chartered Semiconductor Mfg.
- ■ Others
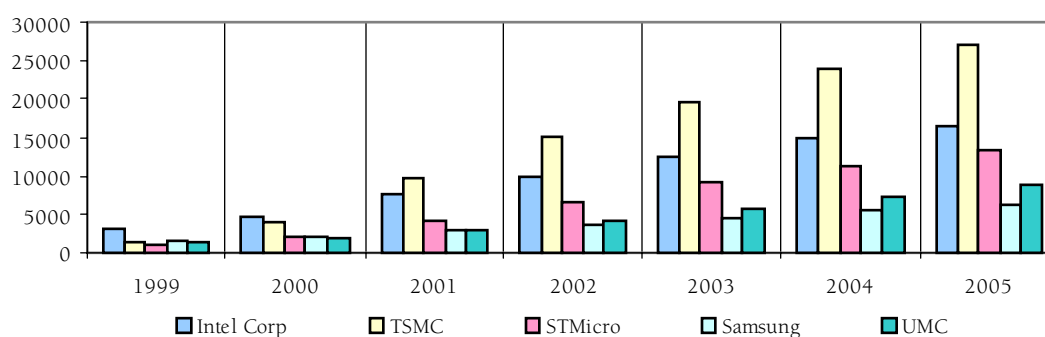
- Although foundry operators vie with each other for large integrated device-makers as customers, it involves the risk of reduced orders in times of future industry slumps. Such unforeseen contingencies are partly offset by "share-the-pain" agreements, by which both parties will share the loss in case of future over capacity.

- investing heavily in its new fabs. In addition, a sizable engineering staff is employed to work with the foundry to enable faster process development and diagnostics by using its most advanced programmable chips as test vehicles.

- Capital spending by the world's biggest players in the industry increased by more than 50% in 1999. However, even this unprecedented rise in capital spending is not likely to satisfy the current customer demand.

Pure-play Semiconductors Market, Worldwide: Annual Estimates/Projections for 1999-2005, Capital Spending by Top Companies (in $ millions)

	1999	2000	2001	2002	2003	2004	2005	CAGR% (2000-2005)
Intel Corp	3200	4822	7435.52	9896.68	12509.4	14848.7	16526.6	27.94
TSMC	1246	3980	9751	15016.5	19671.7	23999.4	27119.4	46.78
STMicro	998	2045	4233.15	6646.05	9038.62	11298.3	13332	45.49
Samsung	1500	2023	2755.33	3590.19	4541.59	5440.82	6338.56	25.66
UMC	1300	1940	2917.76	4172.4	5716.18	7373.88	8774.91	35.23

Hindrances

- Facilities or production capacity of leading companies involved in the industry, need to be enhanced dramatically, without creation of over-building or price declines that could lead to yet another downturn in the industry.

- Newer, more complex technologies have to be employed without losing sight of the competition.

- Expansion also brings with it the problems of management of large and diverse businesses.

Industry Milestones
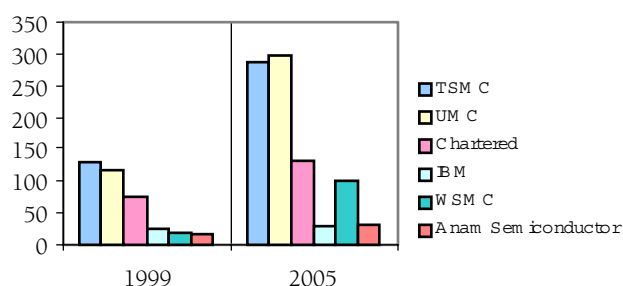
- Industry leaders such as TSMC (Taiwan Semiconductor Manufacturing Co. Ltd) in 1999 had voiced intentions for doubling their annual production capacity from over 1.8 million to 3.4 million wafers by 2001. In addition, TSMC has acquired two existing 8-inch wafer fabs in Taiwan from Worldwide Semiconductor Manufacturing Corp. and Acer Inc.

- A joint venture that is likely to enhance production in late 2000, is the collaboration between Philips Electronics NV and the Singapore Government.

- Two new 12-inch wafer fabs in Taiwan by TSMC are likely to be launched in 2001. These facilities are scheduled to be completed and begin production by 2002.

- Taiwan-based UMC, another leading player in the pure-play semiconductor market announced intentions to expand capacity by more than 36% from 1.76 million 8-inch wafers to 2.4 million wafers by early 2001. Moreover, the company initiated two new 12-inch-wafer fab units: one in Taiwan and another in Japan, in collaboration with Hitachi Ltd.

- Chartered Semiconductors, based in Singapore and US-based Agilent Technologies Inc. have entered into a partnership deal with the Singaporean Government for a new fab facility in Singapore. The company intends to double its production capacity in the coming three years. However, high customer demand is forcing the company to accelerate construction of its new facility and begin production by early 2001.

- During 2000, Hyundai Electronics Industries Co. Ltd. of South Korea announced plans for the conversion of two of its 8-inch memory lines into a foundry facility. The company voiced intentions of becoming one among the three top-most foundry companies by 2003.

- Using license acquired from Toshiba, an Israeli company, Tower Semiconductor Ltd. announced plans to begin the construction of a new fab unit in late 2000.

- In early 2000, both TSMC and UMC launched their respective 0.18-micron manufacturing processes, close on the heels of the launch of Intel's own 0.18-micron technology.

Foundry Capacity, Worldwide: for 1999 & 2005, by 8-Inch Wafer/Month (in 000s)

|	1999	2005	CAGR%
TSMC	128	285.69	14.32
UMC	117	297.31	16.82
Chartered	76	133.46	9.84
IBM	25	28.27	2.07
WSMC	20	101.21	31.03
Anam Semiconductor	15	32.64	13.84

Future Perspective
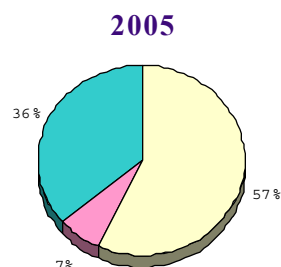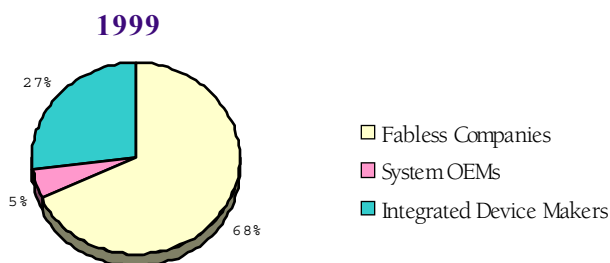
- On one hand, it is quite possible that foundries and their customers might eventually wipe out the existing integrated chip company model. The same factor that led to chip makers stop producing everything from raw silicon wafers to designing and manufacturing of tools, is going to persuade most of the players out of the pure-play market with the exception of the largest and biggest companies.

- However, on the other hand, foundries can offer low-cost manufacturing, but to assume that they can meet all the requirements of the chip industry would be presumptuous at this point of time. It is yet to be proved whether these pure-play companies can provide the more highly specialized processes required by the chip industry.

- In another perspective, the foundries are indeed developing manufacturing expertise and are slowly closing down the technology gap between themselves and the integrated device manufacturers.

- TSMC, Intel Corp and UMC are developing system-on-a-chip strategies such as portfolios of re-usable intellectual property to be used in their respective labs. In addition, the three companies have developed chip circuits using copper, like most integrated device manufacturers.

- Growing technical expertise justifies the integrated device manufacturer's outsourcing strategies. Apart from major players, several other companies too, prefer to outsource these facilities from foundries. Huge and valuable funds can thus be diverted from the building and operation of fabs into marketing, product design and such other potentially high-return activities.

- The Japanese have begun outsourcing only in the past couple of years and will probably provide a new market for foundries. However, higher taxes and operating costs in the country is likely to induce chips to cost more than 15% of the actual price.

Pure-play Foundries Market, Worldwide: Percentage Breakdown for 1999 & 2005, by Customer Category
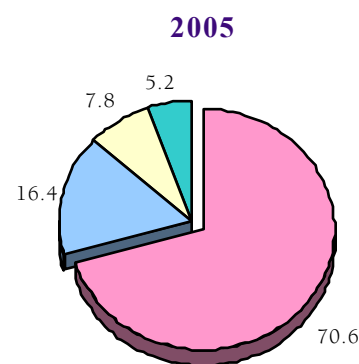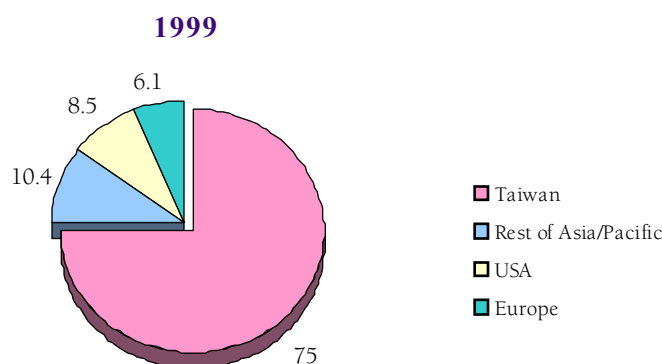
	1999	2005
Fabless Companies	68	57
System OEMs	5	7
Integrated Device Makers	27	36
Total	100	100

REGIONAL MARKETS

Pure-play Semiconductors Market, Worldwide: Percentage Breakdown for 1999 & 2005, by Geographic Region – Taiwan, Rest of Asia/Pacific, USA and Europe

	1999	Market Share	2005	Market Share
Taiwan	5234.25	75.00	13500.84	70.60
Rest of Asia/Pacific	725.82	10.40	3136.17	16.40
USA	593.22	8.50	1491.59	7.80
Europe	425.72	6.10	994.40	5.20
Total	6979.00	100.00	19123.00	100.00

1999

2005

Taiwan

Foundries based in Taiwan accounted for over 75% of the pure-play semiconductor market in 1999. Being the first nation to offer outsourcing facilities in the manufacture of chips, Taiwan has had a head start in this industry. Several factors are conducive for the foundry industry to flourish in Taiwan such as low taxes, huge investment capital reserves, a wide base of local electronics customers and no dearth of qualified engineers, who are mostly trained in the West.

Taiwan Semiconductor Manufacturing Co. Ltd. (TSMC) (Taiwan)

TSMC, the first foundry in the country, began operating as early as 1986. TSMC was funded by the Taiwanese Government and used technology licensed by Philips Electronics NV. In 1999, the company had grown to become a US$2.4 billion powerhouse that has over 40% concentrating on the dedicated foundry market. The company has also earned the reputation of being the most profitable company in Asia, excluding those of Japan.

United Microelectronics Corp. (UMC) (Taiwan)

Incorporated in 1980, UMC was Taiwan's first commercial chipmaker. The company's products have evolved through several product strategies from dialer chips to microprocessors and DRAMs. In 1996, the company announced the spin-off of all its proprietary products and focused completely on its foundry services. Four years down the line, the company has become the second-largest pure-play foundry with over US$2 billion in revenue in 1999.

Taiwan can be easily overtaken by other nations in the dedicated foundry industry if problems such as inadequate electrical network are not attended to immediately. Susceptibility to earthquakes and political instability may prove fatal for this industry in the future.

In spite of the downturn experienced by the industry, Taiwanese companies invested more in new capacity, while most other companies in other regions (S. Korea, Japan and the US) were trying to severely curtail capital spending. The Taiwanese fab companies, unlike their Korean and Malaysian counterparts, have enough internal cash that can finance their own growth, enabling them to borrow for expansion schemes.

Worldwide Semiconductor Manufacturing Corp is another company that is coming to the forefront with key customers such as Toshiba Corp.

Singapore

Another nation that has focused on semiconductors as a major part of its national technology strategy offers better power and infrastructure than Taiwan. However, Singapore has more limited labor supply. Nevertheless, this nation is all set to become one of the leading regions of the foundry industry.

Chartered Semiconductor Manufacturing Ltd. (Singapore)

Initially incorporated in 1980, the company has already three wholly owned fabs and has currently entered into joint ventures with Agilent Technologies Inc. and Lucent Technologies.

Malaysia

In keeping with strategies employed by its neighbors, Malaysia attempted to create two government-backed foundry start-ups. However, these companies failed to pull through the industry slump.

First Silicon Sdn. Bhd (Malaysia)

First Silicon formerly known as InterConnect Technology was the Malaysian Government's second attempt at establishing a foundry. The company voiced plans to develop an 8-inch fab, using technology acquired from Sharp Corp. of Japan.

RAMBUS DYNAMIC RANDOM ACCESS MEMORY

Current Scenario, Market Potential and Growth…

Rambus DRAM (RDRAM) is 10 times superior to other DRAM architectures with a processing speed of 800 MHz. This processing speed is much greater than the frequently used synchronous DRAM (200 MHz). In addition to high processing speed, data is transferred strictly in accordance with layout rules in undistorted signal forms. Faster and distortion-free transfer of data takes place, as data is sent in several bits forming a single packet. However, RDRAM costs thrice as much as synchronous DRAM. Use of 12-inch wafers, shift of process technologies to 0.13 and increase in growth of 256 Mb DRAM is expected to reduce RDRAM costs in the near future. However, potential of Rambus can be fully utilized once its processing speed reaches 1 Giga hertz.
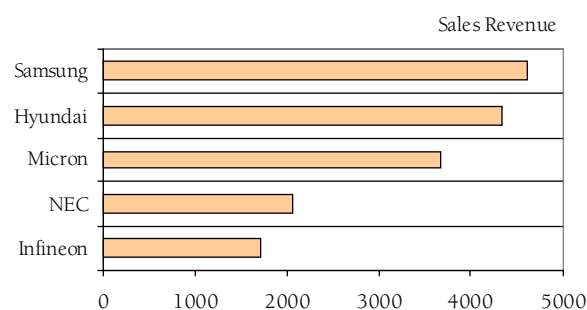
Market Snapshots:

- DRAM and Flash prices are forecasted to shoot up by the end of 2000. Rise in prices may be attributed to low investment in fabs that produce wafers. In addition, SRAM supply is also predicted to reduce though not with the magnitude of DRAM and Flash memories. The supply conditions are expected to continue till the end of 2001.

- DRAMs are more in demand due to new applications in consumer electronics and networking equipment along with improved performance of PC industry (anticipated to grow at 20% during the year), which uses DRAMs in large quantities.

- Bit market is forecasted to grow at 75% to $ 27 billion by the end of 2000 from $20 billion in 1999. Similarly, Flash and SRAM markets are predicted to grow during the year. SRAM market is forecasted to increase to $5.2 billion in 2000 from $4.6 billion in 1999, Flash memories are expected to double to reach $10 billion by the end of 2000.

- The new generation DRAMs are sold at high prices. However, with increase in production, prices are expected to decline.

- With the cooperation of Intel, Rambus is forecasted to reach half the DRAM market by the end of 2004.

- Samsung, company that pioneered RDRAMs, occupies 90% market share of the market.

- Direct RDRAM finds use in telecommunications equipment, networking and high-performance workstations. Direct RDRAM is forecasted to capture 7% of the $30 billion DRAM market, by the turn of 2000.

Rambus DRAMs: Worldwide Estimates/ Projections of Sales and Market Share held by Leading Suppliers of DRAMs in January 2000 (in US$ million)

Company	Sales Revenue	Market Share (%)
Infineon	1700	8
NEC	2050	10
Micron	3672	18
Hyundai	4335	21
Samsung	4603	22

Sales Revenue

Key Aspects:

Rambus DRAM parameters include:

System clock: 400 MHz, Data rate: 800 MHz,
Peak bandwidth: 1.6 GB/S System bus: 16
Package/module: BGA/RIMM Organization: x16, x18