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ACER: AN IT COMPANY LEARNING TO USE INFORMATION TECHNOLOGY TO COMPETE

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Acer: An IT Company Learning to Use IT to Compete

Jason Dedrick, Kenneth L. Kraemer, Tony Tsai

I. INTRODUCTION

Acer Computer is an unusual company in the personal computer industry. Companies such as Dell, Compaq and Gateway focus on designing, configuring, marketing and servicing PCs and increasingly leave the manufacturing to contract manufacturers and OEM producers. By contrast, Acer is a diversified, vertically integrated manufacturer of PCs, components and peripherals that it sells under its own brand name and on an OEM basis for other PC makers. Acer's diversified product line resembles that of giants such as IBM, Hewlett-Packard, Toshiba and NEC, yet it is only a fraction of their size.

Acer's strategies and culture are the product of founder and chairman Stan Shih. Shih started the company in 1976 and has seen it through good times and bad with a combination of visionary zeal and pragmatic flexibility. Unwilling to settle for being just another Taiwanese OEM producer, Shih has pushed hard to make Acer into a global brand name. Yet he has not been willing to focus simply on a single core business as many U.S. PC companies do, arguing that diversification is necessary to Acer's survival. "I understand that a lot of American companies are very focused, but they are not stable; unless, of course, they are the absolute industry leader," he says.[1] Acer's view is that any business that makes money is a good business, or as Shih says "Except wives and husbands, Acer sells everything!"[2]

Shih has achieved broad diversification by encouraging entrepreneurship from within; his approach is to train business managers and then let them look for opportunities to start new businesses. As of 1998, Acer had business units involved in PCs, peripherals, semiconductors, software, Internet services, publishing, multimedia content, distribution, and real estate development. Five Acer units are listed on stock exchanges in Taiwan, Singapore and Mexico, as part of Acer's plans to globalize through strategic partnerships around the world.

In spite of its diversification and efforts to move beyond the low margin business of PC assembly, Acer is first and foremost a PC company. As an original equipment manufacturer for major U.S. and Japanese PC makers, Acer has honed its production processes and lowered production costs, helping to make its own branded PCs more competitive. It has been successful promoting its own brand in emerging markets in Asia and Latin America, where it gained an early lead by developing joint ventures in many countries and targeting those markets while other PC makers focused on larger markets. Buoyed by its low-cost, stylish Aspire models, Acer even broke into the top 10 in the U.S. market in 1995. Since then, however, Acer's branded PCs have lost market share, but its OEM business has continued to grow with large contracts from IBM and others. Acer now is said to be the third largest producer of PCs in the world, although its own brand name ranked only eighth in 1998.

The company's ability to manage such a complex global business has been hindered by coordination problems that hampered its inventory control and supply chain management. Rapid growth and strong profitability in Acer's memory chip joint venture with Texas

Instruments helped mask some of Acer's problems in the mid-1990s, but the reckoning came in 1996, when a severe downturn in DRAM prices turned its semiconductor business into a major cash drain. At the same time, aggressive pricing by major PC vendors such as Compaq, HP, Dell and IBM cut into Acer's branded PC business, especially in the U.S., where the company lost money from 1996 to 1998.

Acer began a major restructuring process in 1997 to gain control of its far-flung businesses, and for the first time, emphasized information technology as a critical tool for revamping its business processes and improving coordination between business units. The irony is that Acer is a major producer of IT hardware and yet was slow to see the importance of IT in its own operations. This contrasts with PC makers such as Dell and Compaq who have invested heavily in IT for years, enhancing both operational efficiency and strategic positioning. As one Acer manager put it, "We are an IT company that is just learning how to use IT to compete."

II. COMPETITIVE ENVIRONMENT

When the IBM-PC was introduced in 1981, it soon became the de facto standard in the PC industry. IBM controlled the market until other PC makers, particularly Compaq, were able to develop IBM-compatible machines that competed directly with IBM. By the late-1980s, a number of new competitors had entered the market with IBM "clones," including AST, Dell, Gateway 2000, Packard Bell and Toshiba. These companies competed simply on price, or by specializing in particular products (such as Toshiba's laptop PCs) or distribution channels (such as Dell's direct sales). A third tier also developed, consisting of no-name PC clones, or "white boxes," usually assembled by local firms from standardized designs and components.

Traditionally, first-tier PC companies, such as IBM and Compaq, competed in the high-end market with better, more reliable PCs, and more innovative products and services. In turn, they charged a premium over second and third-tier vendors. In early 1990s, however, with more standardization of components and experience gained by all manufacturers, the differences among PCs from different vendors narrowed significantly in terms of performance, reliability and functionality. When Compaq changed its strategy in 1992 by cutting prices and aggressively expanding its market share, the competitive structure of the industry changed dramatically. Other premium brands such as IBM and HP were forced to match Compaq's prices, and second-tier vendors lost their price advantage. Companies such as AST and Packard-Bell have since seen their market shares plummet as a result.

One way in which all PC vendors came to compete was by turning increasingly to Taiwanese companies to provide low cost components, and to build PCs on an OEM basis (Dedrick and Kraemer, 1998). Brand name PCs from Compaq, Dell, HP and others were often built by unknown companies such as Mitac, FIC, Inventec and Quanta. Among the Taiwanese PC makers, only Acer decided to promote its own brand name PCs around the world, in addition to building PCs for OEM customers.

By the late 1990s, the PC market was compressed into two tiers: premium brand names and everyone else. With larger sales volumes and better distribution channels, the first-tier vendors are able to cut production costs and expand market share. Their strong presence in

corporate markets also enables them to dominate the market for high margin servers, which sustain their profitability even as they compete on price in the low end desktop market. Thus, the market is shifting toward consolidation. The top four PC vendors, Compaq, IBM, HP and Dell, controlled 36% of the world market in 1997, and their share is expected to rise in coming years.[3] The main victims of this consolidation have been the second tier producers, such as AST and Packard Bell, who have seen their market shares plummet, even after receiving large cash infusions from their new owners, Samsung and NEC.

PC Distribution Channels

With the growth of the PC industry in the 1980s, a number of distribution channels evolved to reach a highly diffuse market that included large corporations, small and medium-sized businesses, schools, government agencies, and consumers. These include specialty computer dealers and value-added resellers (VARs), which play a key role in customizing systems and services to meet the individual needs of business customers. In addition, PCs are now sold by computer superstores, department stores, electronics stores and other retail outlets, which provide varying levels of service and support. All of these outlets are supported by distributors, who handle a number of brands and a wide array of product lines. This distribution network is referred to as the indirect channel or just "the channel," and accounts for the majority of PC sales even today (Figure 1).

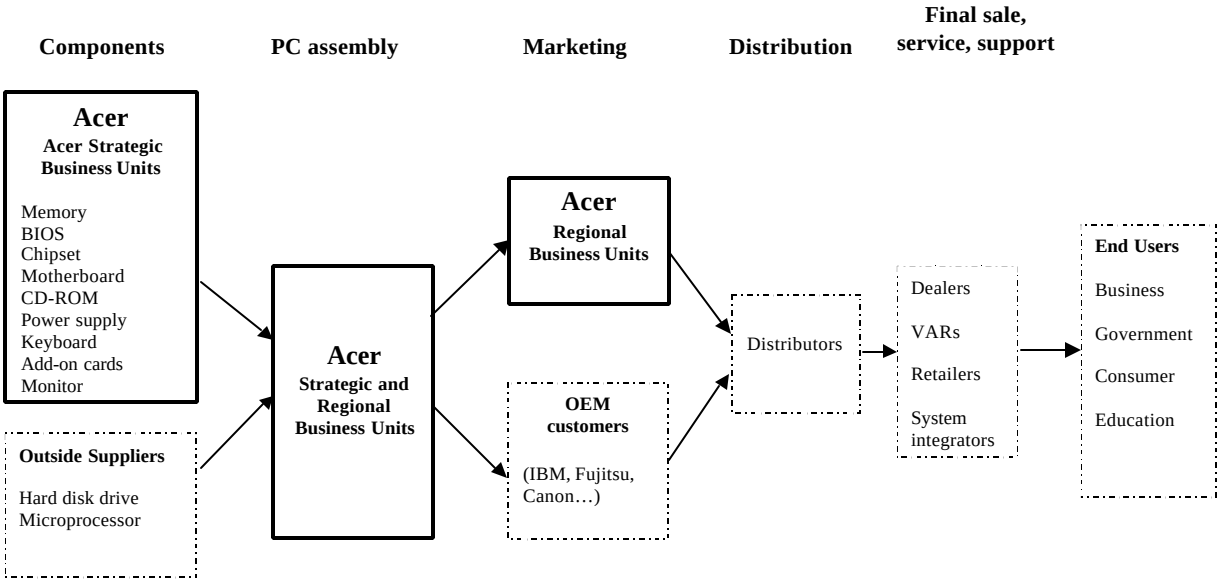
However, an alternative to the indirect channel has grown rapidly in recent years. Starting in the mid-1980s, Dell Computer sold PCs directly to end-users over the telephone, and offered custom configuration to meet customer requirements. As a result of its effective execution of this direct sales model, Dell's sales grew to $2 billion by the end of 1992, and reached $12 billion in 1997.[4] Gateway 2000 used a similar strategy aimed at the consumer market and saw its sales grow to $6.3 billion by 1997.[5] Both of these companies were able to reduce their costs by "cutting out the middleman," while also developing close direct relationships with their customers.

Starting in the mid-1990s, Dell and Gateway offered sales, product configuration, and services over the Internet, creating a new distribution channel for PCs. Selling on the Internet further reduces distribution costs, as the transaction can be completed entirely electronically. It also expands the vendor's reach at a very low marginal cost, because the Internet is a public infrastructure that can be accessed by customers anywhere in the world.

The combination of direct sales and Internet commerce has shaken the entire PC industry and forced the leading indirect sellers to react. Market leader Compaq has responded with a hybrid strategy that includes direct sales and custom configuration in cooperation with contract manufacturers, VARs and distributors. Hewlett-Packard and IBM have stayed with the indirect model but are increasingly outsourcing production to reduce costs.

Acer's position in the PC industry value chain can be seen in Figure 1. Unlike most PC companies, Acer produces most of the components that go into its PCs. It also is the only major company to mix brand name and OEM sales, and has a diversified product line comparable to the much larger IBM and Compaq.

Figure 1. Acer's position in the PC value chain



Acer's business strategies are presented in Table 1 in comparison to the top three PC vendors, Compaq, IBM and Dell. Acer has sold its own brand name PCs through the indirect channel, but is now offering direct sales online in the U.S. It is also shifting from build to forecast production to build to order, a trend seen throughout the industry. Acer's key markets have been small business customers, consumers and OEM customers, whereas major players such as IBM, Compaq and Dell concentrate heavily on the large corporate sector.

Table 1. Comparison of Acer with leading PC vendors

	Acer	**Compaq**	**Dell**	**IBM**
Revenues ('98)	$6.7 billion	$31 billion	$12.3 billion	$81.7 billion
PC business	Brand name and OEM	Brand name	Brand name	Brand name
Channel	Indirect	Indirect	Direct	Indirect
Production	Build to forecast, but shifting to build to order.	Build to forecast, but shifting to build to order via channel and direct.	Build to order	Build to forecast but shifting to build to order via channel.
Manufacturing capability	In-house design, manufacturing of components and peripherals, notebook manufacturing. PC assembly.	In-house design, mother board manufacturing, PC assembly. Notebooks outsourced	In-house design, outsourcing of motherboards. PC assembly. Notebooks outsourced	In-house design, manufacturing of components and notebooks. PC assembly; outsource consumer PCs.
Product lines	PCs, peripherals, components, semiconductors, software, services	PCs, peripherals, plus large systems and services with DEC acquisition	PCs, peripherals	Large systems, PCs, components, peripherals, software, services,
Customers/ markets	Small & medium corporate users; leader in developing countries	Large, small corporate & consumer; US and global markets	Large, small corporate & consumer; U.S. and Europe, expanding globally	Large, small corporate & consumer; U.S. and global markets

III. ACER'S STRATEGIES AND BUSINESS MODEL

Company Background

Acer is the world's third largest PC manufacturer, producing a full line of desktops, notebooks and servers under its own brand name and for OEM customers. The Acer Group has a broad product line including chipsets, motherboards, and DRAM for PCs, and peripherals such as keyboards, CD-ROM drives, and monitors (it is the sixth-largest color monitor manufacturer in the world). It even produces non-computer products such as cellular telephones. The Acer Group employs more than 23,000 employees in 44 countries worldwide, and supports distributors and dealers in over 100 countries.[6]

The company was founded as Multitech International Corporation in 1976 by Stan Shih, his wife Carolyn Yeh, and a group of friends. It began with only eleven employees and $25,000 in capital. Initially, the company was primarily a distributor of electronic parts and a consultant in the use of microprocessor technologies.

Multitech's first PC was an educational learning kit called the Microprofessor, introduced in 1981. In 1982, the company introduced a Chinese home computer for the Taiwanese market. It began manufacturing IBM-compatible PCs for ITT in 1982, and in 1984 introduced its own IBM-compatible PC. In 1986, Multitech introduced a PC based on the Intel 386 microprocessor before IBM did. In 1987, the company changed its name to Acer, a Latin term meaning, among other things, active, energetic and incisive, as a reflection of its growing confidence and the beginning of its transition to a global firm.[7]

Acer grew rapidly, and by 1990, was the world's thirteenth-largest PC maker. Leonard Liu, an executive recruited from IBM in early 1989, was named Acer Inc. President and given responsibility for Acer's PC business. Then, in 1991, after struggling with two costly acquisitions (Altos Computer Systems and Counterpoint Computers) and a price war in the PC industry, Acer recorded its first annual loss, totaling $22.7 million. Acer was forced to cut over 400 jobs in Taiwan, a painful process in a country where large companies are not expected to lay off workers. Liu resigned his post and Stan Shih once again took full control of the company.

In 1992, Acer restructured its organization globally and developed a new business model aimed at bringing "fresh" products to market more quickly. Acer achieved annual revenue growth of over 70% from 1992-1995 to reach $5.7 billion in revenues. Acer was a leading PC vendor in many emerging markets and even cracked the top 10 in the U.S. with its low cost Aspire PCs. Revenue growth slowed in 1996 and 1997, however, as Acer ran into severe price competition from leading PC makers and its DRAM joint venture with Texas Instruments (TI-Acer) began losing money. Revenue growth stagnated and profits fell by 68% from 1995 to 1997.

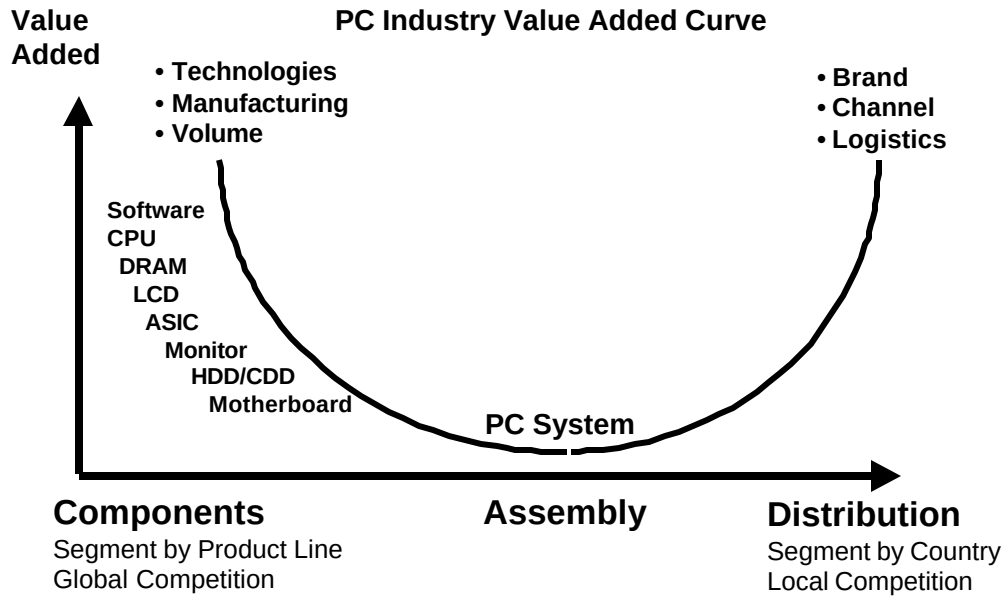
In 1998, Acer bought out TI's share of TI-Acer for US$120 million and renamed the company Acer Semiconductor Manufacturing Inc.(ASMI).[8] In 1999, ASMI signed an outsourcing deal with Fujitsu to produce DRAM using Fujitsu's advanced semiconductor technologies. A new

PC assembly plant was opened in October 1998 in Ciudad Juarez, Mexico, primarily to produce IBM Aptiva models for the North American consumer market. In 1999, the company announced that it would stop selling its own PCs in the U.S. consumer market in an attempt to cut the losses of its U.S. subsidiary. Acer also announced it would produce a new line of low cost, single function devices called XC's for the home market, and is participating in a project to develop set-top boxes based on Microsoft's Windows CE for the mainland China market. These moves were accompanied by a restructuring of the company along five major product lines in order to improve coordination among Acer's many business units.

New Vision, Strategy and Business Model: 1992-1996

Struggling to recover from its downturn in 1991, Acer developed a new vision for competing in the PC industry based on an extensive analysis of the industry's value-chain. This vision is summarized in a figure referred to as Stan Shih's smiling curve (Figure 2). The smiling curve indicates that the industry's high value added activities were shifting away from system design and assembly, which were the traditional strengths of companies such as IBM, Apple and Compaq. Now, the greatest value added comes from manufacturing key components on the one hand, and from marketing, services and software on the other. Shih's smiling curve illustrated the ongoing dominance of Intel and Microsoft at either end of the curve, but it also foretold the success of PC makers such as Dell, Gateway and Compaq who concentrate on design, marketing and customer service while outsourcing most of their production.

Figure 2. Stan Shih's Smiling Curve



Source: Dedrick and Kraemer, 1998, adapted from Acer company documents

Acer's strategy was to find opportunities at each end of the curve in addition to its primary business of PC production. It pushed hard to establish its own brand name around the world and developed new service and information content businesses. It also moved upstream into components and peripherals such as DRAM, CD-ROM drives and flat-panel displays. PC

production still provided the bulk of revenues, supported economies of scale in components production, and served as the link between the two ends of the value chain.

The strategy of competing across the value-added curve presented complex challenges to Acer's organization. The demands of component production are completely different from those of marketing, distribution and services. Acer's components and peripherals would have to compete with Japanese and Korean giants in their high volume manufacturing strongholds. Meanwhile, marketing a line of branded products required understanding the nuances of local markets around the world and developing marketing, distribution and support capabilities in each market. All of this had to be accomplished at a time when PC product cycles were getting steadily shorter, requiring greater speed and flexibility throughout the supply chain.

In order to implement its strategic vision, Acer developed a new business model built around three key elements. "Fast food production" was aimed at improving manufacturing and logistics processes; "global brand, local touch" allowed Acer to customize its products for local markets while promoting the Acer brand globally; "client-server organization" was an organization structure developed to support a decentralized marketing strategy alongside more centralized manufacturing operations.

Fast-food production model

Until the early 1990s, Acer built all of its PCs in Taiwan, then shipped finished PCs around the world by sea to minimize shipping costs. This simplified production management and quality control, but it led to several problems. First, delivery to the end customer could take months from the time the PC was shipped. Because of falling component prices, the value of the PC was dropping the whole time. Second, because of the lengthy shipping process, dealers either had to make very accurate demand forecasts or keep a costly stock of differently configured PCs in order to satisfy customer requirements. Finally, as Acer expanded into new markets, it needed to customize its products to meet local requirements (such as power supply and software language) and national preferences. With the production site thousands of miles away, such customization was difficult.

Acer's response was to distribute final assembly operations around the world. Under the fast-food strategy, components are defined as being either perishable or non-perishable based on how fast they lose value (or spoil) due to technological change. Non-perishable components such as PC housings, floppy disk drives and power supplies were shipped to local assembly locations by sea to take advantage of low transportation costs. Perishable components such as motherboards and memories, on the other hand, were sent by air so that the newest technologies would be always available. Other perishable components not produced by Acer such as CPUs and hard disks were purchased locally.

Fast-food production consists of three major components. The first component is the "central kitchen," which is located in Acer's facilities in Taiwan. The central kitchen performs R&D, product development, and manufacturing. By concentrating manufacturing, Acer could realize economies of scale in production and procurement, and maintain quality control. The second major part of the fast-food model is the distribution center. The distribution center is responsible for distributing Acer components to designated areas for assembly. Third, the

local assembly sites or "Uniload" centers are responsible for the final assembly of PCs as well as for purchasing perishable components. Acer's 40 Uniload assembly sites (as of 1998) are strategically distributed throughout the major markets to ensure prompt delivery.

Acer also redesigned its PCs for easy modular assembly and configuration flexibility. As a result, Acer now has four to five designs of motherboards and three chassis. Every motherboard can accommodate different Intel microprocessors, and any motherboard can fit into any chassis. Such flexibility allows each assembly site to configure PCs with microprocessors, memory, hard disk storage, and expansion slots appropriate for its market. Acer also patented a motherboard technology called ChipUp that allows PCs to be upgraded by adding a newer microprocessor without changing the motherboard design.

Acer has extended the fast food model by setting up manufacturing plants outside Taiwan to cut costs and speed up the delivery of PCs and subassemblies used by the company and its OEM customers. For instance, plants in El Paso, Texas, and Ciudad Juarez, Mexico make PC boards, cases, power supplies, and other products for the North and Latin American markets. Acer has other manufacturing facilities in Subic Bay, Philippines, Suzhou and Guangdong, China, and Tilburg, the Netherlands. Acer Peripherals has plants in Taiwan, Malaysia, China and Mexicali, Mexico.

Global brand, Local touch

In order to develop distribution channels around the world for its brand name products, Acer developed what it calls its "global brand, local touch" strategy. The essence of the strategy is to work with local partners, providing them with a well-known brand name supported by Acer's low-cost global manufacturing resources. In exchange, Acer gained access to local markets without having to develop capabilities on its own for each market.

To implement the strategy, Acer formed joint ventures with partners in several foreign markets in which the partners take a majority interest. With the joint ventures, the complementary assets of both parties (global brand name and local market knowledge) are combined to enhance both parties' competitive position. One aspect of Acer's strategy has been to raise money in local financial markets and even list its subsidiaries on local stock exchanges in Mexico and Singapore. This gives the company access to a wider range of capital resources and enables it to provide stock option incentives to local managers based on the bottom line performance of their own businesses. Acer has stated a goal of listing in 21 markets by the early 21st century, although its recent troubles and reorganization make that unlikely.

The "global brand, local touch" strategy allowed Acer to expand quickly into foreign markets without a large initial investment. Its partners share the financial successes as well as the risks, and since the local partners have a majority interest, they play a major role in the day-to-day management of the joint ventures.

A good example of success with this model has been Acer Computec Latino America, a joint venture with Acer's former Mexican distributor Computec. Through this venture, Acer was quick to enter the Mexican market when it was liberalized in 1990, and was the number one

selling PC brand from 1991 to 1996.[9] Likewise, Acer Computer International has made Acer a leading brand in a number of emerging markets, particularly in Southeast Asia.

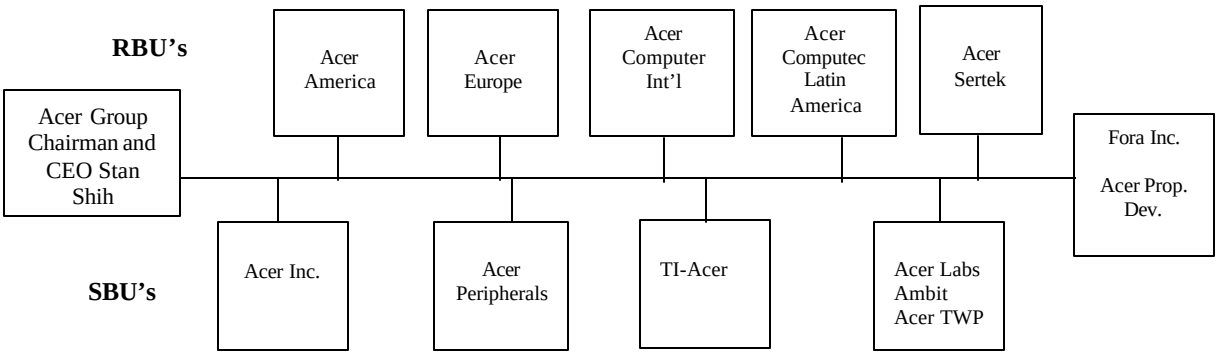
Acer is unique among PC makers in its willingness to give up control of its local operations. Doing so motivates each unit's management team to maximize its own growth and profitability, which in turn will also directly benefit the Acer Group's overall success. On the other hand, this decentralized structure created problems in coordinating corporate activities and in managing inventory and logistics across the company.

Client-server organizational structure

In order to carry out its vision of a decentralized confederation of business units, Acer reorganized itself into a "client-server" organizational structure (Figure 3). In the client-server structure, all of Acer's business units and affiliated companies were expected to act as clients or play dual client/server roles in support of other member companies.[10]

The clients and servers were separated according to either product lines or regions. Strategic Business Units (SBUs) were responsible for the design, development and production of components and systems and were also responsible for OEM sales and marketing. Regional Business Units (RBUs) were primarily Acer-brand marketing companies, responsible for specific regional territories. They developed new distribution channels, assembled finished products, provided support for dealer and distributor networks, and created new joint ventures in key local markets. Put simply: SBUs are technology and manufacturing specialists and RBUs carry out local assembly and marketing.

Figure 3. Acer's client-server organization, ca. 1994



Source: Acer company documents

Acer's growing confederation of companies, linked by a common brand name and cross-ownership was coming to resemble a Japanese *keiretsu* or Korean *chaebol* business group, or one of the large Taiwanese groups such as Formosa Plastics (parent of First International Computer, a major OEM producer). The client-server structure, however, aimed at fostering speed, flexibility and an entrepreneurial culture throughout the organization. The goal of Acer's business model was for each business unit to be a world-class company selling its products to outside customers as well as to other Acer units. In theory, this structure provided market incentives that are often lacking in other vertically integrated, diversified business groups. The price could be a loss of central control, but in Shih's words, "I would rather lose control to make money than (keep) control to lose money."[11]

Acer's client server organization was implemented with little emphasis on using information technology to link the whole complex system together. IT was treated more as an overhead cost than a strategic tool. The combination of a loose chain of command (as illustrated by Figure 2) and the lack of a well-developed information system made it difficult for Acer to coordinate business processes across its business units. It also complicated Acer's ability to respond to a new set of challenges that hit the company in the second half of the 1990s.

Stagnation and Restructuring: 1997-1999

After several years of impressive performance under the new business model, Acer ran into trouble as a result of both external and internal forces. Externally, a new round of price cutting, exemplified by the emergence of sub-$1000 PCs, put enormous pressure on second-tier PC brands such as Acer. Market leader Compaq aggressively lowered its PC prices in order to gain market share and was followed by HP and IBM. Meanwhile, direct vendors Dell and Gateway were making large inroads into the business and consumer markets. Acer felt this competition around the world, as Compaq surpassed its sales in Mexico and several Asian markets. The pressure was most severe in the U.S. market, however, where Acer America began to lose money and market share in 1996. Acer was hurt not only by price wars, but also by its own problems with service and support, which are critical in the consumer markets that Acer had targeted with its Aspire models. These problems were evident in various publications' readers' polls that ranked Acer near the bottom of the pack in quality and service.[12]

Compounding matters, Acer's DRAM joint venture with Texas Instruments, TI-Acer, became a major problem. Although DRAMs were one of the major sources of profit for Acer in 1995, excess global supply resulted in precipitous price drops from 1996-1998. The resulting losses led to the dissolution of the partnership in 1998, when Acer bought out TI's share.

Equally serious were Acer's internal problems. Since each unit was responsible for its own profit-loss results, management often made decisions that made sense from the business unit's perspective, but that were sub-optimal from the group's perspective. This led to serious coordination problems, redundant functions, duplicate investments and the inefficient use of enterprise resources. For example, manufacturing sites would produce components at full capacity without considering the inventory problem caused at assembly locations. In addition, different units would order the same parts and components individually instead of consolidating purchasing, limiting Acer's ability to negotiate with suppliers for favorable

terms and discounts. The result was excess inventory in the system, duplication of functions, and high purchasing costs, all of which increased the company's cost structure.

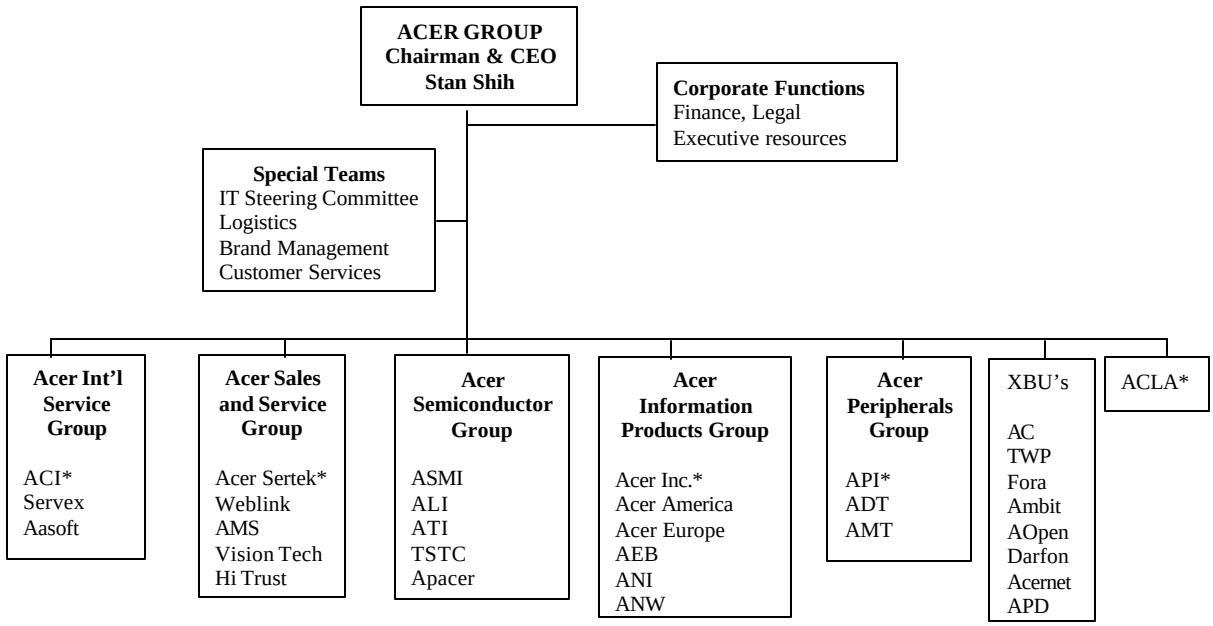
In response to its internal and external challenges, Stan Shih convened a meeting of top executives in 1998 to develop a new vision for the company. The group agreed that PC hardware was increasingly standardized, and that Acer had to add value through software, services and intellectual property. It also agreed that the whole company had to become more customer focused. This meeting led to a decision to restructure the company, grouping most of its business units into five core units, based on lines of business (Figure 4):

- *Acer International Service Group (AISG)*: Responsible for marketing in Asia. Includes Acer Computer International, which is listed on the Singapore exchange.
- *Acer Sales and Service Group(ASSG)*: Responsible for marketing in Taiwan and China. includes Acer Sertek, which is listed on the Taiwan exchange.
- *Acer Semiconductor Group(ASG)*: The former TI-Acer, plus Acer's other semiconductor-related businesses.
- *Acer Information Products Group(AIPG)*: Responsible for PC business, including OEM sales. Includes Acer Inc., which is listed on the Taiwan exchange.
- *Acer Peripherals Group(APG)*: Responsible for computer peripherals and wireless communications products. Includes Acer Peripherals Inc., which is listed on the Taiwan exchange.

Each of these groups was given end-to-end responsibility for a full line of related products or services, from product development to manufacturing to marketing and support. No longer are the manufacturing and marketing functions separated between SBUs and RBUs. This is especially important in AIPG, which is responsible for the entire PC business, including Acer brand PCs and OEM sales. (Note: Acer Computer Latino America (ACLA), listed on the Mexican exchange, is shown outside of the five groups on Acer's organizational chart, but it is 35% owned by Acer Computer International and is responsible for marketing Acer computers in Mexico.

There also are a number of so-called XBU's, including Acer Capital, Acer TWP and Acer Property Development, which do not fit clearly into the five major business groups. Finally, in 1999, Acer announced the creation of a new software company that would pull together its various software businesses and strive to achieve Stan Shih's goal of having software account for 30% of Acer's revenues by 2010. Acer's various companies and business units are described in Table 2.

Figure 4. Acer Group Organizational Structure



* Publicly listed companies

Source: Adapted from organization chart on www.acer.com.tw

Acer established four special functional teams (IT, logistics, customer service, and brand management) directly from headquarters to oversee these four key functions throughout the various business groups. The IT Steering Committee, responsible for coordinating IT across the entire Acer Group, consists of chief information officers (CIOs) from each of Acer's business units. In addition headquarters may also assign cross-group task teams to implement short-term projects that cut across business units.

Table 2 gives the full names and brief descriptions of the companies shown in Figure 4. Each company is listed under one of the five core business groups, or as an XBU. ACLA is listed separately, as it is by Acer on its own published organizational chart, because it is a publicly listed company in Mexico and thus is seen as an independent company (although it is 35% owned by Acer Computer International). Table 2 also shows the tremendous diversity of product and service lines among Acer's many businesses, with different companies involved in a wide range of hardware, software and service businesses.

Table 2. Business Units Within the Acer Group

ACER INTERNATIONAL SERVICES GROUP (AISG)	
ACI (Acer Computer International) Marketing, sales and assembly of Acer brand products in Asia, Africa, the Middle East, Australia, New Zealand and CIS countries	***SERVEX*** software content development
AASOFT software content development	

ACER SALES AND SERVICES GROUP (ASSG)

Acer Sertek (ASI)
marketing, sales and assembly of Acer brand products in Taiwan and mainland China

Acer Marketing Services (AMS)
marketing, sales and assembly of Acer brand products in mainland China

Weblink International Inc.
channel management for computer peripherals and software

Vision Tech Information Technology Inc
distributor for Computer Associates software

HI TRUST
e-commerce security

ACER SEMICONDUCTOR GROUP (ASG)

Acer Semiconductor Manufacturing Inc. (ASMI)
design and manufacture of IC logic chips and DRAMs

Acer Laboratories Inc. (ALI)
design and manufacture of core logic chips, multimedia chips and I/O controllers

Acer Testing Inc. (ATI)
IC testing services

Apacer Technology Inc
design and manufacture of memory modules

Taiwan Semiconductor Technology Corp (TSTC)
IC packaging services

ACER INFORMATION PRODUCTS GROUP (AIPG)

Acer Inc (AI)
design and manufacture of computer systems, components and consumer electronics products, OEM sales

Acer Netxus Inc. (ANI)
high-speed network systems, Internet/Intranet connection systems

Acer Neweb (ANW)
wireless communications equipment

Acer America Corp. (AAC)
marketing, sales and assembly of Acer brand products in North America

Acer Europe B.V. (AEB)
marketing, sales and assembly of Acer brand products in Europe

Acer Softech (ASF)
software design

ACER PERIPHERALS GROUP (APG)

Acer Peripherals Inc. (API)
color monitors, multimedia TV, CD-ROM drives, keyboards, scanners and mobile phones

AMT
design and manufacture of rewriteable media for optical storage and printers

Acer Display Technology (ADT)
design and manufacture of plasma display panels and LCD modules

XBU's

AC (Acer Capital Inc.)
financial and investment management services

TWP (Acer TWP Corp)
publisher of books, magazines and software

Addonics Technologies Corp
peripherals, storage media, computer communications, memory upgrade kits

FOR A
international high-tech product distribution

Ambit Microsystems Corp
design and manufacture of compact circuit modules

Darfon Electronic Inc
Design and manufacture of flyback transformers

Aopen Inc
design and manufacture of motherboards, housings, CD-ROMs and multimedia products

APD (Acer Property Development Inc)
real-estate ventures such as Aspire Park technology center and employee housing plans

Acer Internet Services Inc
Internet service provider

ACLA

Acer Computec Latino America
Marketing, sales and assembly of Acer brand products in Latin America

Acer has had to make hard choices over the past year, particularly the decision to withdraw from the U.S. retail market for PCs and lay off 50 people in the U.S. after losing $50 million there in 1998 alone.[13] The earlier success of the Aspire in the world's largest PC market was a source of great pride at Acer, and reducing Acer's presence in that market is a blow to the goal of creating a strong global brand. However, the company could no longer afford to lose millions of dollars, and it hopes to build for the longer run through direct sales on its ShopAcer Internet site, launched in October 1998.

The goal of Acer's reorganization is to improve coordination among its business units, eliminate redundancy, link product development and manufacturing to marketing and services, and be more customer driven throughout. It is also restructuring its business processes to improve efficiency, reduce inventory and to offer new capabilities such as build-to-order and online sales.[14] In order to make the new business model work, Acer has acknowledged that information technology must play a vital role in enabling and in some cases even leading these changes.

IV. THE ROLE OF INFORMATION TECHNOLOGY AT ACER

Acer's view of IT has changed since 1997. Traditionally, Acer has relied on process improvements and organizational restructuring to meet new challenges. Acer considered IT as a necessary evil but not a key strategic tool. As Acer undertook its corporate restructuring process in 1997-1998, it observed the success with which PC makers such as Dell and Gateway were using IT to achieve competitive advantage.[15] As a result, top management has placed a strong emphasis on catching up in IT and has supported making the investments necessary to do so. The value of IT is no longer measured just by immediate cost reduction, but is also seen in terms of the opportunity costs of not using IT.

IT organization

As Acer adopted the decentralized business model in 1992, corporate IT began to disperse responsibility to each business unit. Each business unit began to build its own information systems with functions appropriate for its own needs. RBUs chose information systems with strong marketing and finance functions because their key functions were sales, marketing and service. SBUs, on the other hand, chose information systems with manufacturing, logistics and distribution functions in mind.

Such a decentralized IT structure led to a number of problems. First, there was no information system in place to provide top management with the information that it needed to run the Acer Group as a whole, nor could individual business units see what other units were doing. As a result, inventory piled up all over the organization, rather than being moved to where it was needed. Also, there was no way of monitoring financial performance in real time, or of tracking the success of various product lines or effectively forecasting demand.

Second, the lack of coordination increased the cost of developing IT applications, as different units did not share resources. So if Acer Computec developed an innovative web-based customer service application (which it did), it would not necessarily be used by other RBU's. Likewise, different business units paid the full cost of implementing a variety of often incompatible applications with similar functions.

Third, the lack of a common information infrastructure made it difficult to coordinate activities among the business units to optimize Acer's internal supply chain. Acer argues that vertical integration should give it an advantage over other PC makers who must coordinate a virtually-integrated supply network involving dozens of outside suppliers and contract manufacturers. Yet without an effective information system to link its own business units, Acer could not realize the potential benefits of vertical integration.

Meanwhile, Acer's external communication with vendors, distributors, OEM customers and suppliers still relied on meetings, phone calls, and faxes. Acer takes advantage of the dense supply network in the Taipei-Hsinchu area to support its manufacturing in Taiwan, but as it moves manufacturing to other locations, it has found a need to develop more structured information systems rather than depending so much on personal connections.

As part of its 1997-1998 restructuring, Acer established an IT Steering Committee consisting of IT department heads from each of the business units. This committee is charged with developing a common vision supported by a set of infrastructure and application standards for the entire Acer Group. Implementation will remain local in order to adapt to the specific needs of each region and business units will make their own decisions about IT investments based on their own business needs. However, once a business unit decides to undertake a particular project or develop and applications, it is expected to follow the standards set by the Steering Committee. The Steering Committee also has the task of encouraging sharing of information and knowledge among the business units in order to improve coordination and to take advantage of the knowledge residing throughout the Acer Group.

New IT Initiatives

The first round of IT initiatives related to the 1998 restructuring covered several major areas:[16]

Electronic commerce for the PC business[1]
Acer quietly launched its ShopAcer online site in the U.S. in October 1998, a few months before pulling out of the U.S. retail market. Volume is increasing every month, with an estimated 2500-3000 transactions/day in January 1999. The U.S. is being used as a test market for Internet sales. Strategies and infrastructure that are proven successful in the U.S. will be used worldwide eventually. ShopAcer uses Open Market's e-commerce software as its IT backbone. Only limited product configuration is available now, as Acer needs to get its supply chain better integrated in order to offer full build-to-configuration capabilities. Acer hopes to have full configuration capabilities available by July, 1999. E-commerce initiatives for the PC business are being carried out under the Acer Information Products Group.

Customer service
Customer service has been a problem for Acer, especially in the U.S. market where the company targeted first-time buyers who needed more support than experienced users. Acer also had difficulties in supporting customers across geographic areas. For instance, an Acer customer from Asia might go to Canada and try to get a notebook PC fixed under warranty, but Acer Canada wouldn't have the information on the customer and his or her warranty. To support multinational customers and travelers, Acer felt it needed an integrated cross-geography customer service database.

In order to improve its customer service, Acer is implementing Siebel 99 customer relations software worldwide. Siebel is being rolled out first in Asia and the U.S. Acer is working with Andersen Consulting in Asia to model its service business, look at future customer service needs and implement Siebel 99. In the U.S., Acer is working with a small consultancy called ASP. Acer America is migrating from its existing Scopus software to Siebel 99, which is an upgrade path developed after Siebel acquired Scopus in 1998.

Siebel is being implemented regionally, but it is a global project. Acer believes that basic business models and technologies should be the same, and experience should be shared, by Acer units around the world. Acer will run Siebel on its regional data centers (1-2 in Asia, 1 in the US, and 1 in Europe). Siebel has replication capability so data can be replicated in different data centers.

Acer also plans to develop 3 regional call centers (North America, Asia, Europe) that can offer customers 24 hour, follow-the-sun service. Now there are two call centers for the Americas, one in Texas and one in Costa Rica. Customer calls are logged into a database called the "Turbo Selling Engine." This data is not only used for customer service, but is also used to communicate with current customers and encourage them to stay with Acer as they upgrade to new PCs. In keeping with Acer's entrepreneurial business model, the Costa Rica

[1] Acer has a number of other e-commerce efforts among its business units, most of which are under the direction of the Acer Digital Service Group. This section refers only to e-commerce in the PC business.

call center also provides customer service for other companies, including Microsoft. But with the company withdrawing from the U.S. consumer market, Acer says it may consolidate these two call centers because the volume of calls should fall off.

Supply chain

Poor supply chain management has been another barrier to improving Acer's performance through better planning, shorter cycle times and reduced inventory. To address the problem, the company is implementing i2 logistics software on a global basis within the AIPG and Acer Semiconductor groups. The first step was implementing. factory planning in Acer's U.S. and European plants. The next step is to implement i2 in Taiwan to control Acer's main manufacturing and supply chain operations. It is expected that i2 will be rolled out eventually for the whole Acer Group, but that will take time.

Extended enterprise initiatives

In addition to internal IT projects, Acer is also taking the first steps toward linking its information systems to those of its customers and suppliers. Acer has begun working with IBM (its biggest customer) on developing close linkages via electronic data interchange (EDI). It plans to develop links with other customers using EDI or business-to-business e-commerce applications. It is also studying whether Acer should develop a community network with its suppliers.

Global network

An example of trying to use resources better across the Acer Group is the decision to rearchitect the company's global network. Now there are a number of networks being run by different business units, with little flexibility in the way network resources can be used or shared. Some networks are overwhelmed while others are underused. Acer is talking to AT&T about developing a single global network, and may outsource the network function completely.

Technology platforms and standards

Acer has a mix of hardware platforms and applications among its business units, and the IT Steering Committee is making decisions on standards for future investments. Taking enterprise resource planning (ERP) software as an example, Acer Information Product Group uses Baan's Triton, while Acer America uses HFA from Friedman Associates running on IBM's AS/400 platform, Acer Latin America uses SAP, and Acer Computer International uses QAD Inc.'s Mfg/Pro software. The first step being taken to improve coordination is to employ a middleware application called Tibco to allow the various systems to communicate and share information. This would help knit together the various ERP's in use, as well as logistics, financial and customer service software.

On the hardware side, Acer strives to use its own PCs and its Altos servers running Windows NT as much as possible. This is feasible for most applications, but there are still various other hardware platforms in use for heavy duty functions. These include AS/400 systems used in Acer America, HP Unix servers used to run large manufacturing applications, and HP workstations used by engineers in the product development teams.

Acer Computec Latino America has developed a web-based information system run out of ACLA's Mexico City headquarters that allows it to track every PC sold through its reseller channels. The system is supported by a large database that includes the serial number of each PC, where it was sold, its configuration, and information on the reseller. This information is valuable in tracking sales and is also used to support Acer's call center and service centers. The web interface makes it easy to access the large amounts of information stored in the database. The database runs on Acer servers under Windows NT, while another Acer server runs Linux as a firewall, illustrating the shift toward "running Acer on Acer."

Table 3 shows Acer's current IT strategies and its plans for the future.

Table 3. Current and planned IT structure

	Current	**Planned**
IT organization	Decentralized	Global planning, local implementation
Information platforms	Non-standardized	Standardized
Use of EDI	Some suppliers and key customer (IBM)	Suppliers and customers
E-commerce	Limited capabilities in U.S. only	Available worldwide with build-to-order capabilities for PCs. Other business units also implementing e-commerce applications.
Servers	Mainframes, minicomputers, workstations, NT servers	Run "Acer on Acer" using NT servers as much as possible
Telecommunication network	Many service providers	Single service provider, possibly outsource completely
IT spending as % of revenues	0.63%	1.5%
Information access	Passive	Proactive
Service	By phone	On line

Source: Interviews with Acer officials

Acer's first restructuring in 1992 was focused on a reengineering of the manufacturing process and reorganization of the company on the client-server model. The role of IT in this restructuring was minimal, and barely rates a mention in the various company documents, press reports, and academic studies of the company during this time. The lack of a coherent IT strategy was one factor that led to subsequent problems, as Acer struggled to manage its rapid growth and decentralized business model. As a result, the second restructuring undertaken in 1998 has emphasized IT as a key element. It is too early as yet to measure the impacts of this restructuring, but it is clear that Acer will not succeed unless the IT elements of the plan are well conceived and executed.

If Acer is to maintain its competitiveness in the PC business, it needs to improve its use of IT to achieve better coordination and improve its productivity. While Acer has put a team in place to handle IT across the whole group, it will have to be responsive to the needs of individual business units as it moves to implement corporate systems and develop a common infrastructure.

V. COMPANY PERFORMANCE

Acer has grown rapidly since its inception, albeit with periods of slow growth and declining profits. Its growth has been driven by expansion of its core PC business and by diversification into new product lines and expansion into new geographical markets.

Performance indicators for the Acer Group as a whole are difficult to compile, so we present indicators for the major listed companies and aggregate them where possible. For operational performance, we focus on Acer, Inc., as data is available and this company is most comparable to other PC makers who serve as benchmarks.

PC market performance

PC sales accounted for 60% of revenues for the Acer Group in 1998, as Acer shipped an estimated 8 million PCs. According to Acer, it is now the third largest manufacturer of PCs in the world, and the eighth largest brand name PC seller. OEM sales have made up an increasing share of Acer's PC business in recent years, up from about 30% in 1995 to 54% in 1998. Major OEM customers include IBM, Fujitsu, Canon, Hitachi, and Siemens, with IBM accounting for about 50% of OEM sales.[17]

Acer brand PCs ranked eighth in the world in unit PC sales in 1995,[18] a number that company reports say was still true in 1998. According to McKinsey and Company, Acer ranked tenth in 1997 in terms of revenue from PC sales (Table 4)

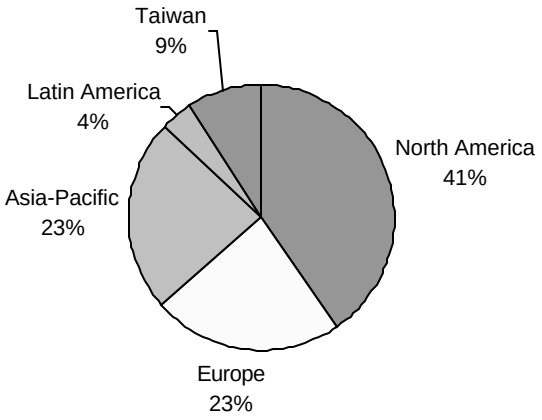
Table 4. PC market share by vendor's revenue, 1997

Company	Market share (%)
Compaq	13.1
IBM	9.6
Dell	8.5
Packard Bell	6.9
Hewlett-Packard	6.4
Gateway	5.1
Toshiba	4.6
Apple	4.3
NEC	4.1
Acer	3.5

Source: McKinsey and Company (1998). *The 1998 Report on the Computer Industry*.

In terms of geographic results, Acer's total North American (US and Canada) sales have grown rapidly, reaching 41% of total revenues in 1998. This growth has come in spite of the decline of Acer's brand name sales, which has been more than offset by strong growth in OEM sales. Europe accounted for another 24% of sales, Asia Pacific for 24%, Latin America for 4% and Taiwan 9% (Figure 5).

Figure 5. Acer's revenues by region



Source: Acer investor relations: http://www.acer.com.tw/about/investor/index.htm

Acer's brand name PCs have been most successful in emerging markets in Asia and Latin America, where competition from U.S. firms is less intense than in North America and Europe (Table 5). Especially important is the absence of direct vendors Dell and Gateway from many of these markets, due to the difficulty of executing the direct model in countries with poor infrastructure and lack of experienced PC users. The Asian financial crisis has hurt Acer in some of its strongest markets, particularly Southeast Asia, yet Acer Computer International has remained profitable serving the Asia market, with profits of about US$12 million in 1998. However, Acer Computec Latino America reported a loss of US$35 million in 1998, as it faced severe competition from U.S. PC makers.

Table 5. Acer's PC market share in Asian countries, 1997

Market	Acer market share (%)
Taiwan	18
Indonesia	16
Hong Kong	15
Thailand	15
Philippines	13
Malaysia	12
Singapore	11

Source: Dresdner Kleinwort Benson Securities (1998).

Acer Sertek, serving the Greater China market, reported a profit of US$12 million in 1998. Acer failed in an earlier attempt to penetrate the mainland market, and has only about 1% of the PC market there[19]. However, Acer has leased land to increase production in China and sees the mainland as a major growth market for the future.

Acer America reported losses of US$81 million in 1996, US$71 million in 1997 and US$50 million in 1998.[20] (These figures only reflect Acer's branded business, as OEM sales are credited to Acer Inc.) The problems in the U.S. included falling prices, which hurt all PC

makers, but more serious were Acer's own problems. Because it was selling mainly to the home user market, Acer experienced high return rates which are common in that market. And because Acer America is only a marketing unit, it had to absorb the costs of writing off those returns. Acer also had problems providing service and support to those users, who require a great deal of hand holding. Acer's brand image was hurt by its service problems, making it difficult to compete with Compaq, Gateway, IBM and Hewlett-Packard, whose brand names are much stronger in the U.S.

Acer Europe has been somewhat more successful. Sales grew from US$547 million in 1996 to an estimated US$872 million in 1998, while the company roughly broke even each year. Acer backed out of a deal to buy Siemens Nixdorf's PC business in 1998, but still makes PCs for Siemens as an OEM.

Table 6 shows the revenues and profits of Acer Group members.

Table 6. Revenues and profits of Acer Group companies

Company	1998 Revenues (US$ millions)	1998 Profits (US$ millions)
Acer Inc.	2,900	75
Acer America	1090	(50)
Acer Europe	872	3
Acer Sertek	470	12
Acer Computer International	1350	20
Acer Computec Latino America	280	(35)
Acer Peripherals Inc.	1200	44
Acer Semiconductor Manufacturing Inc.	184	(160)

Notes:
-Total sales exceed total Acer Group sales, due to inter-company sales
-Profits are listed in press reports and may or may not reflect share of profits or losses in associated companies. Thus, they should not be seen as reflecting the Acer Group's profitability as a whole; rather as showing the performance of different units.
Cross ownership:
-Acer America and Acer Europe are wholly owned by Acer Inc.
-Acer Sertek is 35.18% owned by Acer Inc.
-Acer Computer International is 63.4% owned by Acer Inc.
-Acer Computec Latino America is 35.9% owned by Acer Computer International
-Acer Peripherals Inc. is 44.6% owned by Acer Inc.
-Acer Semiconductor Manufacturing Inc. is 50% owned by Acer Inc., and partially owned by Acer employees.

Other businesses

Acer Peripherals Inc. has been a steady performer for the Acer Group. API is the world's fifth largest monitor maker, with production in Malaysia, Taiwan, China and Mexico (60% in Malaysia). API also produces CD-ROM drives, scanners and keyboards, and is entering the DVD business as the market migrates away from CD-ROMs. API is moving outside of the computer business by producing cellular phone handsets, a business that it sees as having strong growth potential. It is also entering a joint venture with IBM to produce flat-panel displays in Taiwan's Hsinchu Science Park. API's revenues were about US$1.2 billion in 1998, with profits of US$44 million.

Acer's semiconductor business has been a major drain on profits. ASMI (the former TI-Acer) is estimated to have lost US$160 million in 1998, following a US$170 million loss in 1997, thanks to the crash in DRAM prices. While the company admits that ASMI lost money the first quarter of 1999, it forecasts a profit for the full year, thanks to the shift to 64M DRAM production and a large manufacturing contract for Fujitsu. The concern over the fate of ASMI is reflected in the fact that Stan Shih has taken charge of the unit directly. If Shih is able to achieve such a turnaround, Acer's group results should rebound.

Acer's other businesses, such as software, Internet services, and publishing account for a small share of group revenues, but Shih sees them as key growth drivers for the future. For instance, he has set a target for software to account for 30% of Acer's sales in 2010.

Operations

The early success of the fast food model was evident between 1993 and 1994, when Acer's inventory turnover fell from 95 days to 49 days.[21] However, improvement stagnated after that, and by 1997, there was still 48 days of inventory on hand within Acer Inc.[22] This is evidence of the inefficiencies of the client server organizational structure, in which each business unit is likely to get stuck with unnecessary inventory due to poor coordination between marketing, logistics and manufacturing.

Compared to companies such as Dell and Apple, which have less than 7 days of inventory, and even to the PC industry average of 25 days, Acer's inventory levels are extremely costly. Acer cannot reduce inventory by forcing its suppliers to hold inventory as Dell does, because Acer is its own biggest supplier. However, there is room for considerable improvement, and this is one area that the reorganization is expected to help, by putting manufacturing and marketing under one business group. In addition, Acer's IT initiatives are expected to have their greatest initial impacts in improving operations. Implementation of i2 logistics software, and linkage of the various ERPs via the Tibco middleware software is expected to help by making timely information available to managers throughout the supply chain.

Acer has been more successful in reducing overhead expenses. SG&A at Acer Inc. dropped from 17.9% of revenues in 1992 to just 8.9% in 1998.[23] This compares with Apple at 15.3%, Dell at 9.8%, Compaq at 16%, and Gateway at 14.1%.[24] Like most Taiwanese PC companies, Acer excels in lowering costs throughout the company, following the example of Stan Shih, who is said usually to travel alone and carry his own baggage.

Financial performance

Acer's performance over the past decade has been marked by two major growth spurts, followed by slowdowns when faced by new internal and external challenges (Figure 6 and Table 7). In the late 1980s, Acer grew rapidly until its own mistakes combined with a major shift in the competitive environment for the PC industry led to record losses for the company. Acer's corporate restructuring and adoption of the three-pronged business model enabled it to regain its footing and achieve high growth rates from 1993-1995. Then a new series of challenges led to a second period of stagnation, and a second corporate restructuring.

Figure 6. Acer Group revenues and net income, 1989-1998

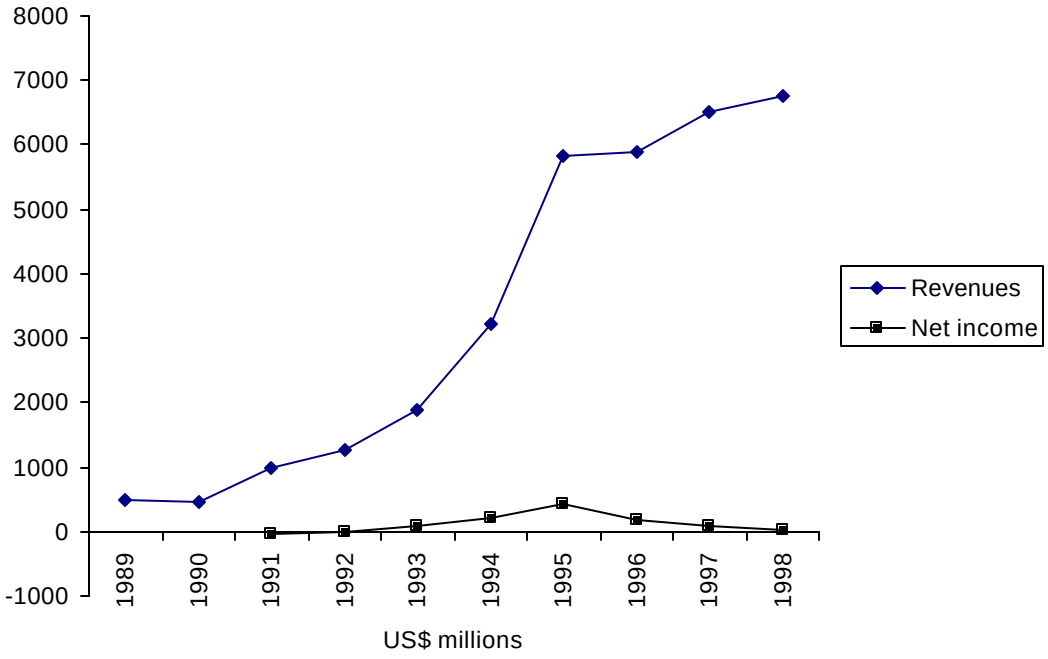


Figure 6 and Table 7 show the rapid growth, followed by stagnation in revenues, and the rise and fall in net income during the 1990s. However, Table 7 and Figure 7 also show that the net income picture is more stable when the impacts of the TI-Acer business are taken out. TI-Acer was highly profitable from 1993-1995, but fell into the red in 1997-1998. The rest of Acer's business, primarily its PC and peripherals businesses, actually experienced solid profit growth through 1997.

Table 7. Acer Group revenues and profits, 1989-1997

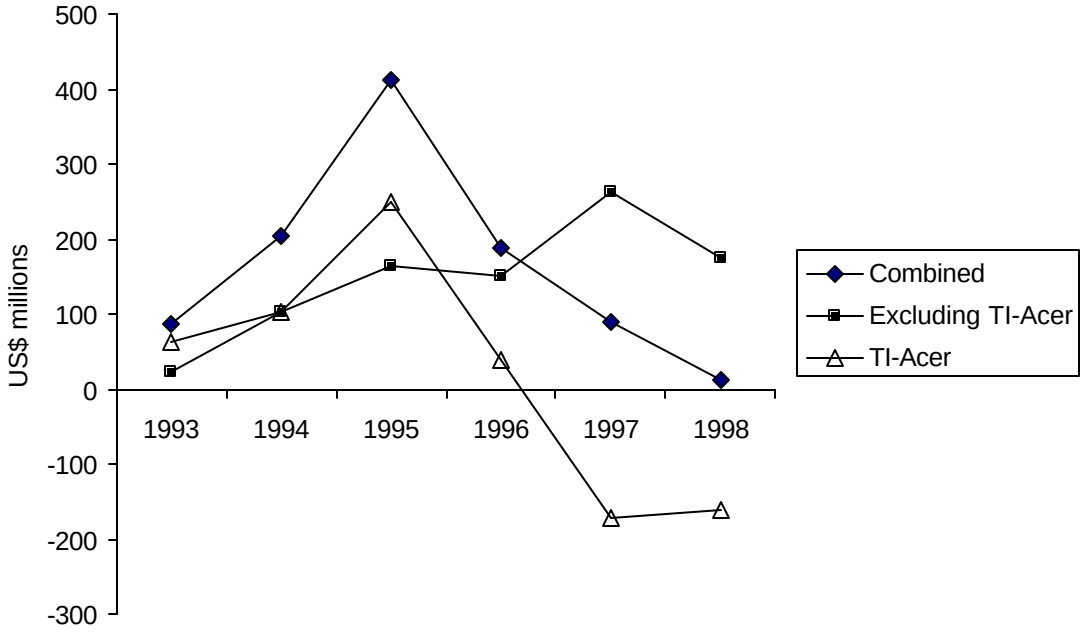
Combined and excluding TI-Acer

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Revenues										
Combined	482	461	981	1260	1883	3220	5825	5893	6509	6717
Excluding TI-Acer					1651	2901	5262	5346	6132	6633
TI-Acer*					232	319	563	547	377	184
Net income										
Combined	n.a.	n.a.	(23)	2	86	205	413	188	89	13
Excluding TI-Acer					22	103	163	150	262	174
TI-Acer					64	102	250	38	(173)	(161)

* Name changed to ASMI in 1998

Source: Acer 1998 annual report

Figure 7. Acer Group profits and losses with and without TI-Acer



Reports in early 1999 suggest that Acer is seeing a new growth spurt. The company forecast that its first quarter sales for 1999 would be up 40% from 1998 first quarter sales, driven mainly by strong OEM sales, but also by a 20% rise is Acer brand PC sales. The question is whether the company can protect its profit margins in the face of price pressures throughout the PC industry. With PC prices in the U.S. falling to the $500 level, even Acer's low cost manufacturing skills will be severely tested.

VI. CONCLUSIONS

This case illustrates how the implementation of new strategies and structures without a strong role for IT can lead to costly problems. Acer's 1992 strategies were the product of a clear vision of the PC industry and a business model aimed at improving the company's operations (through "fast food" production), expanding its reach (through "global brand, local touch"), and encouraging entrepreneurship and flexibility (through the "client server" organization). The problems faced by Acer in the mid-1990s were largely a product of poor coordination among the company's many business units, a situation exacerbated by the failure to develop common IT systems needed to enable better coordination.

The first issue facing Acer as it embarked on its corporate reengineering in 1998 was the need to improve its operations. Acer's "fast-food" production process was innovative in 1992, but its principles of getting fresh products to market have been surpassed by Dell, Gateway, Micron and now Apple. Those companies have used IT to achieve "virtual integration" with their own suppliers to achieve better operational performance than Acer has gotten through vertical integration. Virtual integration also allowed the PC makers to push the inventory

problem onto their suppliers, by requiring suppliers to hold components in inventory until they were needed for assembly. Under Acer's vertically integrated model, it was its own biggest components supplier, and it was stuck holding its own inventory. The situation was made worse because marketing and final assembly were separated into different business units from manufacturing, so it was difficult to match supply and demand.

The changes underway since 1998 involve a simplification of the organizational structure to more closely integrate production and marketing in each of five core business lines. This restructuring also is aimed at streamlining business processes in order to take advantage of Acer's strengths in manufacturing and address serious problems in inventory management, marketing and customer service. For the first time, information technology is being given a prominent role in solving specific problems—for instance in the implementation of Siebel 99 to improve customer service globally and the use of i2 to manage logistics. IT is also being deployed to improve coordination among business units and to give top management timely information to make decisions.

A second and more fundamental issue is whether Acer's diversified business model is viable in an industry marked by focus over diversification. Broad diversification is normally associated with much larger companies such as IBM, Hewlett-Packard, Fujitsu, Toshiba and NEC, which have sales of $30 billion to $80 billion. In contrast, Acer's size is comparable to that of Gateway (around $6 billion), and it is smaller than Dell ($12 billion), yet those companies are highly focused in both product line (PCs), and distribution channels (direct sales). Yet in some markets where Acer is now competing, size is still a competitive factor, especially capital-intensive components such as semiconductors and LCDs. However, Stan Shih says that the question of focus versus diversification has been raised whenever academics have studied Acer, and he believes that the company's long-term growth has vindicated his vision for Acer.

Acer's business model has real and potential advantages and disadvantages. In a time of clearly defined markets, it is probably better to be a highly focused company such as Dell or Gateway, who have been able to execute specific strategies for competing in the PC industry. On the other hand, if the PC should go the way of the minicomputer, Dell and Gateway could go the way of DEC or Data General. Even if they recognize the change and try to adapt, the factors that made Dell and Gateway effective in producing customized products with very short product cycles might not serve them well in markets based on simple standardized hardware such as the various information/Internet appliances now being developed.

By contrast, Acer's flexibility and diversification could help it respond better to major changes in the market. Acer has already introduced a line of "XCs", which are low cost, single purpose computing and communications devices. Its various business units are also active in software, multimedia content, Internet service, and wireless communications. These could be winning businesses in the future. But those markets won't be any less competitive than the PC business, so overdiversification could just lead to being a weak competitor in each market. Still, Shih is a pragmatist when necessary, as illustrated by the decision to pull out of the U.S. retail market, even if it meant a setback for his goals of establishing the Acer brand name and reaching the top 5 in global PC sales.

A critical element in Acer's whole restructuring will be how well it can apply IT to better manage and coordinate its far flung operations. The company is committed to make the necessary investments, and has created a steering committee to get the whole Acer Group moving in the same direction on IT. On the surface, Acer appears to be at a stage similar to that of Dell or Compaq in the mid-1990s, when those companies were putting in the basic IT applications and infrastructure to tighten their operations and support rapid growth. Acer has identified those companies as role models for IT use, and has the advantage of learning from their experience. Acer's ability to catch up in IT will depend on how well it can develop and implement a coherent strategy for IT that fits its own business needs, organizational structure and culture. A key question is whether top management will impose enough control over its independent-minded business units to enforce common standards and require them to make the needed investments to implement corporate-wide IT strategies.

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