

# Economic analysis of dell desktop computers industry

[Technology](#), [Computer](#)



Recommendations 31 References 33 1. Introduction Michael Dell started the company in 1984 with the revolutionary idea to sell custom built computers directly to the customer. As one of the world's premier providers of computer products and services, Dell now designs and manufactures a impressive family of desktop solutions for virtually every computing need.

Within the last five years, Dell has grown from \$7 billion in revenues to more than \$35, 4 billion, and the company continues to expand in its current products and regions, and also into new markets. This makes Dell to the second largest seller of Computers and Computer products after Best Buy. As result of Dell's direct business model, Dell became leading seller of computer systems worldwide and the market leader in all customer segments of the United States.

The success of Dell's direct selling strategy is reflected by an increase of almost 100% n net revenues over the past five years The key principles of Dell's business strategy are: (1) a direct relationship to its customers that provides a constant flow of information about customers' plans and requirements and enable Dell to continually improve its product offerings; (2) Customers can purchase custom-build products and custom-tailored services, which contributes to the efficiency in meeting the customers' needs and reduces inventory levels by a faster inventory turnover; (3) Dell is the low-cost leader, enabled by a highly sufficient supply chain management and manufacturing organization; (4) Dell revived a single-point of accountability for its customers by offering an array of services designed to provide customers the ability to maximize return on investment, system

performance and efficiency ; (5) Dell believes that standards-based technologies deliver the greatest value to customers because it provides flexibility and choice while allowing the purchase decisions to be based on performance, cost and customer service. On January 31, 2003, Dell had approximately 39, 100 regular employees, with about 21, 200 located in the United States. Dell has the luck of never having faced a work tople due to labor difficulties and the organization beliefs that its employee relation is good.

In this study research, we analyze Dell's Desktop PC's in the US market. The US accounts for 35% to 40% of global unit PC demand. Dell offers a wide range of computer systems (desktop computer systems Servers, storage, networking products, workstations, notebook computers, software and peripheral products), of which we focus on desktop computers. Dell offers two different desktop computer systems. The[[email protected](#)]version is for the corporate and institutional customer segment that demands highly-reliable, stable, manageable ND easily serviced systems.

The[[email protected](#)]products target small businesses and home users with a need for fast technology turns and high-performance computing. 2. The Industry Demand 2. 1 .

Overview Rapid change is a key characteristic of the industry, and how well a company manages this variable can determine whether it emerges as an industry leader, a second- or third- tier player, or worse yet, not a player at all. During each evolutionary phase of the computer hardware industry, the price for computing power has decreased, usability has increased, and the

market has broadened. The rapid proliferation of the Internet culminated in strong growth for the computer hardware industry in 1999 and through most of 2000. However the industry's fortunes reversed in 2001 and demand remained soft in 2002 due to the global economic downturn.

The huge decrease in worldwide shipment growth can be attributed to the merger of H-P and Compaq computers. There were overlapping products and high inventory costs for not sold products in 2001. Moreover, the lackluster U. S. Economy is likely to hurt the PC demand. The Gross Domestic Product (GDP) fell 2001 from 4. 1% to only 0. 3%. The US economy began to recover from the recession in early 2002, finishing the year with 2. 4% growth. Standard & Poor's currently forecasts real GDP growth of 2. 4% for 2003 and 4. 4% for 2004. Furthermore, the PC market is disgusted with PC's. A large part of the population owns a PC by now, and people do not need a new one. Their old one is sufficient for their needs.

Although computer technology has progressed rapidly in recent years, the performance of the computer for 'the average customer' has not improved significantly. A strong recovery in PC demand does not appear imminent. According to IDC (International Data Corp. ), the GDP growth stays like in 2002 at 2. 4%. In the first quarter of 2003, worldwide PC shipments rose 2. 1% since the consumer spending remained weak and commercial PC demand failed to recover materially. In such a weak demand environment we see an aggressive price competition. To notify is that Toshiba, a manufacturer of Laptop PC's, which is a technical substitute of Desktop PC's,

moved up to the five top PC makers in terms of market share, both in the United States and worldwide.

This move reflects the continued move in demand favoring tote books over desktop computers. The forecast of the consumer market is more optimistic. It dropped 19.6% in 2001 and rose 8.4% in 2002. In 2003 the rise is predicted to advance 11.3%. Dell was #1 in the first quarter of 2003, concerning global PC shipments. The company posted 24.7% unit growth for the first quarter, far outperforming the overall market (which rose 2.1%) and the other vendors in the top five. The most important competitors of Dell are Fujitsu, Siemens, Hewlett-Packard, IBM and Toshiba. In the above chart, you can see the percentage changes of growth rates of PC makers from previous year.

Dell has the largest growth, that's because it's aggressive pricing strategy (15% price advantage) and its advantage as a direct seller. It can pass lower component costs through to customers faster than its rivals can. It thus leads the competition in price cuts to gain market share. The company also intends to leverage its position as the low-cost producer in the PC Industry. Price The computer desktop market is driven by a strong price war. The lower the price, the higher is the quantity demanded. (This is proven by the price elasticity of roughly -1 we calculated. Keep in mind that it is difficult to compare the prices between the different years. First, there are several noticeable shifts in technology.

Therefore the performance and especially the equipment for desktop computers changed significantly. This means, today, you will get a better PC for less money in comparison to five years ago. Second, the data we researched does not consider the annual inflation. Thus if we include the inflation in this variable, the prices of earlier years will increase. Third, the average desktop price is not weighted, as it does not consider the different prices of the PC's and the share of the total quantity sold. The price changes of the several desktops that are sold to the different consumer groups may differentiate. GAP As you can see, the influence of the GAP to the quantity demand is also significant. If the GAP increases by one percent, the quantity demanded increases by 2.53%. ) This confirms the results we researched independently from our regression. Hours spent online The hours spent online increased constantly from year to year. This variable seems to be independent from economic influences. The money spent online per person per year increases as constantly as the hours spent online per person per year, so we can see here a strong dependency. 2. 4. Forecasting In order to come up with a reliable forecasting for the future demand situation, we have to make a linear trend analysis. Here, we assume a constant period-by-period unit change in the variable " quantity".

A linear relation between firm sales and time, can be written as: The coefficients of this equation can be estimated by using the least squares regression method:  $y = 1,882608 t$  Using this equation estimated over the 1999-2003 period, it is possible to forecast firm sales for future periods. To do so, it is important to realize that in this model,  $t = 1$  for 1999,  $t = 2$  for

2000, and so on. Thus, we can make a sales forecast for the next periods by simply subtract 1998 from the year in question to determine a relevant value for  $t$ . Here, the value for  $t$  for the year 2004 is 6, and for 2005, it is 7.  $S(2004) = 1,882,608$  and  $S(2005) = 1,882,608 + 168,082.93$ . Note that these sales projections are based on a linear trend line, which implies that sales increase by a constant dollar amount each year. Dell's sales are projected to grow by 1,882,608 units per year.

### 3. Costs and Production

#### 3.1. Overview

Dell manufactures a great majority of the products in its own facilities. Its headquarters are in Round Rock, TX and the US manufacturing facilities are located in Austin, TX and Middle Tennessee. In order to optimize the worldwide distribution channels, Dell has built factories on 4 different continents. The company manufactures in Brazil, Ireland, Malaysia and China. Dell believes that its manufacturing processes and supply-chain management techniques provide a distinct competitive advantage. Under Dell's manufacturing processes, Dell means its build-to-order manufacturing process, which allows reducing costs and providing customers the ability to customize their product purchases.

The supply-chain management decreases Dell's exposure to the risk of declining inventory values. Moreover, it allows the company to quickly incorporate new technologies and components into the products, and Dell can quickly pass cost savings directly to the customers.

### 3.2. Costs

#### 3.2.1. The organizational structure

On January 31, 2003, Dell had approximately 39,100 regular employees. 21,200 of those employees were located in the US. The following table shows the number of Dell's employees in recent years: Dell

employs mostly high qualified labor in various departments like the Information Technology-, Legal-, Procurement-, Finance-, Marketing-, e-commerce and Web Technology-, Product Development- and Human Resources department.

Unskilled labor is needed in the Manufacturing- and Facilities Department. Dell has a flat vertical integration. There are few hierarchical levels and thus a relatively wide span of control. The horizontal differentiation of Dells organization is a Matrix. There are two bosses per employee - one for functional tasks and one who is responsible for the project. This provides a great amount of freedom for employees. Dell has mainly highly qualified and professional employees who perform best in autonomous, flexible working conditions. Because differentiation is very high in Dell's businesses and the company must be able to respond quickly to the environment, a matrix structure is the best integrating service.

It is built on the basis of temporary task forces-where one member of each function or division is assigned to solve a specific problem. Members also perform many of their normal duties while serving on the task force. 3. 2. 2.

Fixed costs The fixed costs consist of research, development, and engineering, long-term assets, employer- and skilled employee costs, rent and leasing costs and expenditures for licenses. The innovative computer industry requires the latest information about the newest technologies. These costs can be regarded as research, development and engineering costs. We assume that the information costs are constant in the average and thus fixed.



The property costs include investment costs, costs for equipment and buildings and infrastructure. These costs belong to the selling, general and administrative cost. We assume the skilled employee and employers as fixed cost. Despite the fact that the number changed in the last years the main part of the workforce is needed independently from the sales. The skilled employee and employer belong to selling, general, and administrative costs. Dell owned or leased a total of approximately 10.6 million square feet of office, manufacturing and warehouse space worldwide and 7.0 million square feet of which is located in the U. S, and the remainder located in various international areas.

These costs can also be considered as selling, general and administrative cost. Dell has entered into a variety of intellectual property licensing and cross-licensing agreements. In addition, Dell has entered into nonexclusive licensing agreements with Microsoft Corporation with various operating system and application Software. Dell has also entered into various soft- and hardware licensing agreements with other companies. These costs are reported as special charges.

### 3. 2. 3 Variable Costs

The variable costs include everything which depends on the output, like energy, raw material, purchase products from suppliers, distribution, inventory and unskilled labor. They belong to selling, general and administrative costs.

So Dell can react flexibly if the market demands changes and hire or fire unskilled workers more easily, whereas skilled labor has to be employed continuously because of the shortage of high qualified employees in the IT sector.

### 3. 3. Production

#### 3. 3. 1 . The manufacturing process Dell's

manufacturing process consists of 3 main elements - assembly, functional testing, and quality control. All parts are tested, no matter if they come from the supplier or from their own factory. The quality of the various parts is tested at the different stages of manufacturing. This includes controlling of completed units, ongoing production and failure tracking for early identification of production- and impotent problems. Moreover there are service and support programs which customers can use to report errors. 3. 3. 2.

Research and development Dell's objectives in product development are designing and developing standards based competitively priced products that have the technologies and features most desired by its customers. Therefore they interact with the world's most advanced technology companies to manage quality, integrate technologies and design and manage system architecture. This is the reason for their success to offer the newest technology on the market 4. Market Structure 4. 1 . Overview In order to appraise the extend to which the consumer PC market is meeting the informational needs of US customers; we first need to know how that market is structured and which direction it takes. The United States is still the driving force of the worldwide PC industry.

With 34% of total sales, and 38% of both commercial and retail revenues, the US market makes up the lion share among all global markets.

Furthermore, the US market consists if 32% of all home PC's and 26% of all non-home PC's currently in use around the world. Figure: Home PC's in use worldwide 2001 and 2007 (in Millions) However, the US market is on its way

to significant change. Empowered by unprecedented declines of more than 25% in consumer PC sales, overall sales were down by 12. 2% during 2001. The decrease of 15. 8% in consumer PC during 2001 also impacted the revenues. This decline by the downward pressure of retail prices. While Banc of America Securities (2001) estimated a 3. % decline in the average selling price of all types of PC unit in the US market, aggressive discounting by manufacturers and retailers has led to much steeper price falls in some categories. There is some evidence that the US consumer PC market is saturated. Penetration rates for home PC's in the United States are amongst the highest in the world with current estimates that say that 61% of households own at least one PC and over 26% of all households own two or more. A Forrester Research study of US households intending to purchase PC's in 2001 is another proof for the market saturation. Furthermore, a recent study has shown that 52% of all consumers who do not yet own a PC have no intention to buy one in the future.

They do not see a need in having one. Figure: Home PC Penetration, 1995-2002 (as percent of households with at least one Declining demand and lower margins have led to significant consolidation amongst PC manufacturers serving the consumer market. This trend has led to the situation that the market is dominated by 6 manufacturers. In fact, the CRY (share of the four leading firms) in shelf space allocated to desktop PC's by leading PC retail stores in the United States total 95%. These Big 4 are HP/Compact, Sony, Machines, and Apple. In the direct-sales channel, two

manufacturers - Dell and Gateway - account for more than half of all retail PC sales.

These manufacturers have tried to stabilize their dominant position by clearly fragmentation their brands to appeal the different types of PC buyer. While HP/ Compact appeals to the mass market, Gateway has focused on semi-professional users, and Dell on the more knowledgeable consumer. And while Machines has targeted customers that look for low-price machines, Sony and Apple have focused on the high-end of the market. As mentioned before, the majority of US consumers intending to buy PC's are existing owners. As consumers have become more experienced, the base of potential buyers to whom more specialized retailers can appeal has expanded. Especially direct-sell manufacturers profit from this background.

This move has been led by Dell whose aggressive pricing strategy in 2001 saw its share of consumer sales increase by more than 50%. Their strategy is supported by the openings of so called kiosks in shopping malls that enable potential buyers of direct-sell- PC's to use Dell systems before they purchase them online. 4. 2 Barriers to entry Barriers to entry, an advantage for industry incumbents over new arrivals are multifaceted in the computer hardware industry. 4. 2. 1 . Economic barriers 4. 2. 1. 1 . Aggressive Pricing In recent years the computer hardware market grew slowly with 3. 2 percent in 2002 or even decreased in 2001 (15. Percent) as a result of the economic lack buster.

Because of Microsoft's monopoly in the operating software market (over 90 percent of PC's worldwide use Windows) and Intel's monopoly in the processor market (80 percent of PC's use Intel processors) the standardization of the PC increases. As follows the best possibility to gain market share and stay successful is aggressive pricing. Compact, for example, decreases its PC prices significantly in 1992 and gained a lot of market share. Today, Dell is the price leader because of its direct selling strategy and increased its market share by 24.7 percent in the first quarter of 2003. As you can see computer manufacturer rely on Intel and Microsoft and they have to produce a high quantity of products to get special offers and discounts to produce a good quality, but low price PC.

For potential entrants it is difficult to offer and sell large quantities of desktop PC's because of competitor's aggressive pricing and cost advantages.

4. 2. 1. 2. Inventory and forecast risks

The insatiable satisfaction of the market is necessary to have success in the computer hardware market. As the technology shifts rapidly this includes some risks. The correct forecast of the future market demand, the optimal product mix, and the emend of raw materials is difficult and expensive. During 1994 Compact made some mistakes to forecast the customers' switch to Intel's new Pentium processor. As follows Compact had to decrease the prices of PC's that worked with the old 486 processor and made losses.

In 1995, for example, all competitors had a large inventory to fulfill the estimated increasing demand after the launch of the Windows 95 operating system. Because of the shortage of DRAM chips many manufactures bought

as much memory as possible. After the launch of Windows 95, however the demand came in below expectations and the prices of DRAM decreased sharply. So many companies made losses because of their high inventory and companies' profits decreased.

4. 2. 1. 3. Short product life cycle The product life cycle of the desktop PC is still short (about 2 years), but increased recently to 3 - 4 years. The companies make at least 50 percent of the new product's profit in the first six months after the product's introduction.

Quality problems in the first months after launching can create serious financial problems. The companies have to develop constantly new products and have a high need for cash.

4. 2. 1. 4. Differentiating on quality and service Because of the aggressive pricing in the market, companies try to differentiate their products through advertising. They focus on product performance, reliability, quality and after sales service. Customer "overnight" supports are a standard service and expensive to fulfill. It is also important to promote the brand names and the product's perceptions to potential customers. Newspaper, magazine, and TV advertising represent these efforts to create a special product image.

4. 2. 2.

Legal barriers to entry Warranties and consumer rights During the first after weeks after the purchase of a new personal computer many customers are confronted with problems of the operating system or the reliability of the Desktop. Five years ago the manufactures tried to disclaim the responsibility for these problems and shifted the responsibility to the dealer. So customers had to fight with unprofessional after sales service and high shipping costs to

solve these problems. As a reaction the US Consumer's Union and several state legislatures tried to introduce laws to shift the responsibility for after sales problems from the customer to the producer.