

# Analysing product development within dell computers



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The Product Development at the Dell Computer Corporation case can be summarized with just its name, product development. The case focuses on development of Dell's personal computers, highlighting the area of the laptops.

The personal computer industry can be dated back to the 1830's and Charles Babbage with his invention of the first digital computer. However with limitations of materials and marketing his vision mainly stayed on what is called " the drawing board." It was not until the time period of World War II when a factory size computer was created by army engineers, they were named Mark I and Colossus and they were 50 feet in size. Through the 1960s and the 1970s only the government, mainly for defense, and big business had the opportunity to use computers. As technology increased and microchips replaced the wires and transistors, and financial availability became friendlier for consumers the microcomputer revolution began. In the 1970s and 1980s Apple Computer was a successful leader in a commercialized interface that was easy to use. Apple set the technological pace for cramming as much new technology in to their products as possible. IBM who was always trying to play catch up with Apple kicked off its traditional corporate based computer line, with strong direct sales and service. Dell also released its own branded personal computer in 1981. During the 1980s personal computer sales grew from nothing to \$40 billion dollars.

It was in 1983 when Dell Computer was started by Michael Dell, who at this point in time was a freshman at the University of Texas. He would upgrade IBM compatible computers and go door to door selling them. The success

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was overwhelming for Dell, and he moved off campus and dropped out of school, with the initial idea of returning back to school if there was failure with the business. However, with \$180, 000 in sales during his first month the idea of going back to school never entered his mind. The next step for Dell was to buy and assemble his own brand name personal computers and get them directly to the customers. This is where Dell's principle to eliminate the middle man began. With this premise in mind, high growth rates and attractive margins the building of the Dell name began. Soon, Dell would start a 24 hour complaint hotline and they would offer a supply of backup replacement equipment. By 1990, Dell computers had a distinctive line of its own personal computers which won several trade magazine awards for service and products.

By 1990 microcomputers accounted for 40% of all computers sold. And there was major competition the brands helping to drive down the costs of manufacturing as well the cost for the consumers. With the development and success of Dell and their direct to consumer sales as well as their laid back sales manner, imitators such as Gateway 2000 and CompuAdd began business. While focusing on the competition Dell expanded in to the retail market attempting to gain more revenue. However, this was unsuccessful since Dell overshot the target budget of sales, finding them in a cash crunch. It was then decided on that that needed to do something different. They needed to stand out again

## **The Dell Business Model**

The Dell business model is a simple one. " Eliminate the middle man". Dell sold its computers directly to customers with no retailers in the middle.  
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Customers are able to order a customized computer that fits their needs. Customers like universities, large corporations, and government agencies all have different needs when it comes to computers. Dell also kept this strategy with its small customers. People can order a computer based on battery life, software applications, size, gaming, business orientated, and many other customizations. A great advantage with this business model is that Dell can maintain a low inventory cost which saves the company lots of money.

### **How it works**

Dell achieves this business model by having a small lead time from when the computer order comes in to when it actually gets to the customer. This is very important to Dell's success because the negative to directly selling to the customer is that the customer cannot just walk into a Dell store or retailer and just buy the computer. Dell has a general lead time of 3-5 days. This is the time it takes to build the computer and ship it. This doesn't include the couple of days for the shipping. The lead time can vary depending on the type of customization. Sometimes it could be longer or shorter based on inventory and the depth of customization. This is a major advantage for Dell to be able to ship computer within days. Dell must plan, build, and test vigorously all within the 3-5 days. This also allows Dell to maintain minimal inventory of hand. Unlike other computer companies, Dell does not have to have ready-made computers on hand. If Dell experiences a slow month in sales then it doesn't cost them as much as its competitors because Dell is paying less for inventory overhead. This great success is a

product of the new structured operations that Dell has implemented starting with the product development process.

Another advantage of Dell's business model is the 24-hour customer support system that it offers. Dell offers this option so that customers can call at anytime to fix a problem with one of Dell's computers. Not only is the feature convenient for the customer, but it is also very effective. In the Harvard case, it states that the customer support team was able to solve problems themselves 91% of the time. That is an amazing statistic that reflects Dell's training program and due diligence on building and retaining customer relationships.

### **Argument: Is Dell's business model effective?**

Yes, Dell's business model is a good one and is very effective. This has always been Dell's business model and has brought it so much success. Only for a brief period in the 90's did Dell try and tweak the business model by getting into retail. This only proved to Dell that its original business plan was the best because Dell suffered some losses and sales decreased during this time. Also Gateway, a competitor, had adopted Dell's direct sales strategy which gave them great success. Dell's original business plan is the best plan for many reasons. The direct sales approach lets them build and retain customer relationships because there is no middle man in between Dell and the customer. The 24-hour customer support program lets customers give direct feedback to Dell and makes the customer feel appreciated when Dell is helping them, not an IT representative from a retailer. Another competitive advantage this business plan gives Dell is the inventory control. Dell is

known for turning over inventory better than any other computer  
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manufacturer in the industry. This plan allows Dell to achieve such great inventory control. When Dell went into the retail side it could not keep up with turning over inventory as fast as it used to when it was selling directly to customers. In conclusion, Dell's original business plan is very good and extremely effective. It is proven in the Harvard case when Dell moved away from its plan.

## **Industry Technological Developments**

In the computer industry there were some key technological evolutions that led to a great competition between the industry's firms. During the 1970's the industry saw some great technological advancements. These findings were crucial to the computer firms today because they made it easier for the companies to make, sell, and meet the needs of its customers. The major developments were improved microprocessors, standard operating systems, increased availability of software, and cheaper memory. These developments made the computer industry an attractive market for many. Another development that came later was the battery technology. Batteries for laptop computers advanced which led to even more competition. Since the competition is so great, companies need to find other ways to compete other than resources. For the most part the computer firms used the same technology so one of the ways the firms could get a competitive edge is through its product development process.

Dell was a firm that realized the highly competitive nature of the computer industry during the 1990's. In 1993 Dell found itself losing money and in the "shakeout period" of the computer industry. This is the period of time when competition is at its highest and only the strong firms survive. The weaker

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firms will be “shaken out” of the market and will dissolve. Dell was one of the few firms that realized that it needed to do something different to compete and survive. Dell decided that it needed to look at its product development process.

## **Dell Product Development Process**

### Original Product Development Strategy

Dell’s original product development process was very informal. The process was very amateur and lacked structure. First, the process involved self-governed teams that had no accountability or management. The teams were made up of engineers and developers that had all the same ideas or similar strategies. Second, risks were not being assessed properly in these teams. Since the teams all had similar viewpoints the members were collectively overlooking risks. The biggest problem with this process was that projects were being passed onto the next stage of development when it should not have been. This leads to fail projects which in return cost Dell lots of money and time which could mean the difference in such a competitive market. The margin of error for Dell was slim to none during this time. When Dell had a major project fail which cost it several millions of dollars, it went to management, engineers, and developers to see what their opinion was on trying a new process. The management wanted a new process that had more structure. The engineers and developers wanted to keep the old process mainly because they thought that structure would stifle their creativity. After a long debate Dell decided to change its product development process. Dell decided that its old process was similar to a start-up company’s process and not an experienced company, like itself.

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## New Product Development Strategy

The new product development strategy was much more formal. The teams now were called “ core teams” which were made up of a mix of engineers and managers who had different views and techniques. Dell wanted diversity in its groups to encourage conversation and debate. Each group was also held responsible for a project from start to finish and the team was governed by an outside manager. This made the teams accountable for all their decisions and moves. The new process had six phases in which each phase would last around 3 months. The total time for a project was approximately 18 months.

Profile Phase- Teams would write a guide on the new product and its market that it would be sold in

Planning Phase- Teams create a detailed business case for the product which must be viewed by a senior manager before it is passed onto the next phase

Implementation Phase- Teams must design and test prototypes of the product and orders must be made to the suppliers

Qualification Phase- Teams build production prototypes and key customers give feedback

Launch Phase- The customer experience is tested, from opening the product to setting up and using the product. Early adopters have their orders filled

Acceptance Phase- Teams collect feedback and reports are compared to actual results.



## **Argument: Which process is better?**

The new product development process is much better than the old process. This is easy to see because of the results. Dell has survived the shakeout period and has become one of the industry leaders. The new product development process allowed Dell to create better products because of the versatility of the core teams and also cut down on failures because of the structure of the new process. Fewer errors were a result of each team being held accountable for errors and have a senior manager evaluate the product before advancing to the next stage.

## **Which Battery?**

In 1991, Dell came out with its first line of the portable computer. And in 1992 Dell's portable computers accounted for 17% of sales. However, with the backlash of rumors about unreliable screens, frequent power failures, being slower than most other portable computers and broken hinges Dell could not compete even with their low prices.

Early 1993 brought about the cancelling of Dell's new line of laptops. Under the guise that they were too slow and not ready for sales. After recalling 17,000 notebooks, Mark Holliday, the portable division head of Dell, calls a meeting with all of the company officers and forces a decision for a battery to be made. During this meeting it is decided that there are three different battery decisions that Dell can go with. At the meeting it was decided that the battery decision must be made at the end of Phase 1 (the profile phase) of development and the three different choices are NiHi Nickel Metal Hydride, LiOn Lithium Ion, and the last choice was to not make a choice really, it was to defer a choice.

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The first choice for batteries was the NiHi otherwise known as the Nickel Metal Hydride. The chart below shows what some of the disadvantages and advantages to the NiHi battery. Overall this battery would not have been a great choice for Dell, because it did not solve the problem of lasting more than 3 hours like the consumers wanted and it could not recharge to its full potential. The second choice was the LiOn also known as the Lithium Ion Battery this is was the battery that Dell ended up choosing and still uses today. The third and final choice that dell had was to defer the choice of batteries, this would give Sony time to develop the battery and get a good production line going. This would also allow for Dell to be prepared for either battery design.

## Types of Battery

### Advantages

### Disadvantages

### NiHi

### Nickel Metal Hydride

Takes up less space then

the LiOn

Provide limited product differentiation in an increasingly competitive market

Allows for more accessories

Such as communication control and memory management

Short battery life, normally less than 3 hours.

Would involve no delays in

Production demand

Can only recharge a fraction of full capacity

A less risky choice

If not disposed of properly they could release heavy metal toxins in to the environment.

Type of Battery

Advantages

Disadvantages

LiOn Lithium Ion

Longer rechargeable lives

Unproven and more expensive technology

**MORE RISKY CHOICE**

Can recharge to full potential

Takes up more space than conventional batteries

Laptop customers insisted on longer battery lives

No production demand studies completed

Cold possibly boost sales

Production committed to Sony for at least a year

Type of Battery

Defer Choice

Advantages

Disadvantages

Dell could have 2 options for battery space

Having the bigger battery (LiOn) would be less attractive to the customer

Give Sony the time to test the LiOn battery

Variable costs in both battery designs would be too high

Dell could continue with product development of the laptop in general

Cold possibly over design the battery space

Could give highest return, if LiOn was chosen and fails there is the NiHi to use

Battery charging circuitry would have to be designed for both batteries.

## Strategy and Finances

One of the major decisions for Dell was to choose the right battery power for its new Laptop which was targeting the laptop market. A strategy is a set of actions that coordinate the resources and commitments of a business to boost its performance. Strategy selections should be guided by the firm's situation rather than by historical choices. Choosing a strategy that makes sense for a particular business is a decision which may lead to superior performance. There are a few choices that steer corporate strategies. Cost-Based Strategy requires a firm to be the lowest cost producer in the market. This can be lowest cost labor to efficiency in operations. Spirit airline is an example of this strategy. They are billed as the " ultra-low-cost carrier". Spirit operates 28 Airbus planes and serves Eastern and Midwestern cities in the United States. (Longenecker, et al. 2009)

The second type of business strategy is Differentiation-Based. This model emphasizes the uniqueness of a firm's product or service. This model places emphasis for the consumer to be convinced of the uniqueness and value of the product or service, whether real or perceived. (Schermerhorn, 2010). Dell looked to achieve this type of strategy.

Dell focused on the need to connect with their customer, remove the middleman and speak directly to their customers. Dell start their innovation process with asking their customers, " What would you really want this thing to do? Is there a different way to accomplish that?" Then they meet with their suppliers and ask, " Can we do this in a different way?" Then they try to come up with a totally different approach that exceeds the original objectives.

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<http://www.forbes.com/2009/09/02/dell-amex-marriot-cmo-network-adtrend.html>

The focus strategy selection of the battery power would impact the company in hopes of gaining market share through satisfied customers. Michael Dell and his team needed to relate to their environment, particularly to the customers and competitors. Choice of battery technology was of vital importance to Dell. Many factors were evaluated;

1. Competition abounded due to imitation of Dell's direct model
2. Dell felt a cash crunch due to their rapid expansion
3. Lack of senior management capable of guiding the firm
4. Lack of structure in Dell's product development process, growing importance of the portable computer market
5. Lack of senior management capable of guiding the firm toward maturity
6. Lack of structure in Dell's product development process Growing importance of portable computer industry
7. High rate of battery life in minds of consumers
8. Limited life of the NiHi battery
9. Uncertainty of the emerging LiOn battery technology

Dell was dependent upon the future success of the new "Laptitude" laptop product to revive its share in the portable computer market. Dell was hoping

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to distinguish itself with the introduction of the fresh LiOn battery technology. Unfortunately, the LiOn technology was immature and risky but, Dell needed to make a decision of whether to adopt this technology in the new product line or remain with current technology. Ultimately, Dell needed a winner and needed to make the critical and right decision to ensure an emergence back into the already competitive market along with a need for a significant financial infusion.

Tenacious is a good word to describe Michael Dell and the company he created. And tenacity and efficiency will be enough to keep Dell in the game. But to rise to the next level and really boost its growth, it may have to find a little more heart. [http://money.cnn.com/magazines/fortune/fortune\\_archive/2006/09/18/8386121/index.htm](http://money.cnn.com/magazines/fortune/fortune_archive/2006/09/18/8386121/index.htm)

Dell's new product development process was put to the test immediately as the decision was being made on how to develop a new laptop PC. Market research identified battery life as the third most important feature to customers when purchasing a laptop. "One way the company distinguishes itself from other suppliers of perform-alike PCs is by acting quickly on the masses of data it gathers from customers." Information is a valuable competitive weapon," says Tom Thomas, chief information systems officer. "Our whole business system is geared to collect it". ([http://money.cnn.com/magazines/fortune/fortune\\_archive/1993/09/27/78384/index.htm](http://money.cnn.com/magazines/fortune/fortune_archive/1993/09/27/78384/index.htm)). Due to a chance meeting between Michael Dell and Sony executives, Dell had the opportunity to have exclusive access to the new Lithium Ion (LiOn) battery technology which greatly extended battery life, and offered superior overall performance to the standard Nickel Hydride (NiHi) technology. The new <https://assignbuster.com/analysing-product-development-within-dell-computers/>

technology would add value to Dell laptops as they sought to recapture market share. The technology was not fully developed however, and there was a risk that it would not work. Dell thus faced a critical decision about how to allocate resources for the development of the laptop. Four options were identified by the product development team:

Option 1- commit to the old technology (NiHi)

Option 2 – commit to the new technology (LiOn)

Option 3a – over-design the computer so that it could accommodate either type of battery, thus deferring the battery commitment until later

Option 3b – dual design (in parallel) of laptops that would use either NiHi or LiOn technology

### **Option 1: Continue with a proven battery technology (NiHi)**

According to estimates made by project manager and product marketer, Henry McCarty, Dell's market share will be 2.5% if Dell stays with the status quo battery configuration of NiHi. This equates to 825,000 units sold over the estimated 3 year product life. Given an average gross margin per unit over life of product of \$600 and expected \$10 million expected cost of development effort, the expected profit margin is \$485 million. There is 100% confidence that the NiHi battery product will work.

### **Option 2: Go with the new battery technology (LiOn)**

The new Development Team, McCarty predicts Dell's market share to jump to 3.0% or 990,000 units over 3 years, if LiOn technology works. If the LiOn



technology fails, Dell's market share will fall to about 1.25% or 413,000 units over 3 years. This drop in market share would be attributed to competitors already having an established product on the market, while Dell undergoes substantial rework, 70% of original schedule, and 30% of cost to switch back to NiHi. There is only a 60% confidence that the LiOn battery product won't fail. Given an average gross margin per unit over life of product of \$600 and expected \$10 million expected cost of development, the expected profit margin is \$444 million under option 2.

### **Option 3a: Dual Development – Defer commitment until qualification phase review**

Dual Development option has an estimated \$10 million expected cost of development and an additional fixed cost of \$2.5 million because Dell would have to develop two technologies at the same time. These are the actual project costs incurred which incorporates the additional designers and engineers, material and tooling costs, etc. These costs do not include the product opportunities Dell would forego if they had to pull people away from other projects. Given the new fixed costs and calculating a weighted average of expected profit margins based on the success rate of the technology, option 3a has an estimated profit margin of \$542 million, the highest of the three options.

### **Option 3b: Over-design – Defer commitment until qualification phase review**

Similarly with the dual development we need to calculate the cost of the over-design strategy. The expected cost will be \$10 million for development and additional variable cost of 0.5% of revenue (2.0% of margin) since Dell

would have to develop two technologies in the same time. Due to the LiOn battery's different dimensions and properties, Dell would have to over-design the computer case, charging circuitry, and battery management software to accommodate either battery technology. Given the new variable costs and calculating a weighted average of expected profit margins based on the success rate of the technology, option 3b has an estimated profit margin of \$533 million. This is the second highest of all options.

One study of Dell looked at the "Sensitivity Analysis of estimated profit margin if the confidence probability of LiOn technology changes. Based on the assumption McCarty provided, it shows clearly that Option 3a is the best option as long the Confidence of LiOn Technology is between 10%~90%. It is also obvious that if Dell knows 100% that LiOn will be successful Dell should choose Option 2. If the chance of success will be 0%, Dell should choose Option 1". [http://www.mbanerds.com/index.php?title=Product\\_Development\\_at\\_Dell\\_Computer\\_Corp](http://www.mbanerds.com/index.php?title=Product_Development_at_Dell_Computer_Corp).