A Study On Consumer Perception – A Case Study For Laptops

** P. V. Ranjith*
*** Ela Goyal*

INTRODUCTION

Mobile computing has become highly popular in the last decade, and advances in computer and mobile device technology allow users to meet their computing needs from every place at any time **(Sears & Arora, 2002)**. Following the success of desktop computers, laptop computers have become highly popular as portable versions of desktops with the full functionality of desktop computing and the portability that allows users to carry them anywhere. Although in the early days of laptops, the price of a laptop with the same functions of an equivalent desktop could be two to three times higher, the difference in prices shrank in the mid - to late '90s. With advances in Liquid Crystal Display technology, hard disk, mobile processor, and wireless communication capabilities (such as Wi-Fi networks), laptop computers became highly affordable, managing to deliver high performance in computing. In May 2005, laptop computers for the first time outsold desktop computers in a single calendar month **(Sandoval, 2005)**. Laptops were originally considered to be *"a small niche market"* and were thought suitable mostly for *"specialized field applications"* such as *"the military, the Internal Revenue Service, accountants and sales representatives"*. But today, there are already more laptops than desktops in businesses, and laptops are becoming obligatory for student use and more popular for general use. In 2008 and 2009, more laptops than desktops were sold in the US. Despite the high popularity of laptop computers and their great advantage in portability, laptop computers still have disadvantages when there are portability requirements. One major issue concerning the limitations of laptop computers is the obligation to use the keyboard and a pointing device (a touch pad, eraser head pointer, trackball, or an external mouse). In addition, there is a trade-off between a laptop's functionality and its weight.

Battery-powered portable computers had just 2% worldwide market share in 1986(Laptop computers gain stature as power grows, 1986). But today, laptops are becoming increasingly popular, both for business and personal use(The Falling Costs of Mobile Computing). In 2008, it was estimated that 145.9 million notebooks were sold, and in 2009, the number grew to 177.7 million (The Falling Costs of Mobile Computing). The third quarter of 2008 was the first time when notebook PC shipments exceeded desktops, with 38.6 million units versus 38.5 million units(The Falling Costs of Mobile Computing, Notebook PC Shipments Exceed Desktops for First Time in Q3, The PC Doesn't Have to Be an Anchor, Intel: laptop/desktop crossover coming sooner than expected)

For Microsoft Windows systems, the average selling price (ASP) showed a decline in 2008/2009, possibly due to low-cost netbooks, drawing 689 US$ at U.S. retail in August 2008. In 2009, ASP had further fallen to 602 US$ by January and to 560 US$ in February. While Windows machines fell by 129 US$ in these seven months, Mac laptop ASP declined just 12 US$ from 1524 US$ to 1512 US$ (Netbooks Are Destroying the Laptop Market and Microsoft Needs to Act Now).

HISTORY OF LAPTOPS

A laptop is a personal computer designed for mobile use and is small and light enough to sit on a person's lap while in use. A laptop integrates most of the typical components of a desktop computer, including a display, a keyboard, a pointing device (a touchpad, also known as a trackpad, and/or a pointing stick), speakers, and often including a battery, into a single small and light unit. The rechargeable battery (if present) is charged from an AC adapter and typically stores enough energy to run the laptop for three to five hours in its initial state, depending on the configuration and

* *Senior Lecturer,* SIES College of Management Studies, Sri Chandrasekarendra Saraswati Vidyapuram, Plot 1-E, Sector V, Nerul, Navi Mumbai. E-mail : rv99321@gmail.com
** *Senior Lecturer,* SIES College of Management Studies, Sri Chandrasekarendra Saraswati Vidyapuram, Plot 1-E, Sector V, Nerul, Navi Mumbai. E-mail : elagoyal@gmail.com

power management of the computer. Laptops are usually notebook-shaped with thicknesses between 0.7-1.5 inches (18-38 mm) and dimensions ranging from 10x8 inches (27x22cm, 13" display) to 15x11 inches (39x28cm, 17" display) and up. Modern laptops weigh 3 to 12 pounds (1.4 to 5.4 kg); older laptops were usually heavier. Most laptops are designed in the flip form factor to protect the screen and the keyboard when closed. Modern tablet laptops have a complex joint between the keyboard housing and the display, permitting the display panel to swivel and then lie flat on the keyboard housing. As the personal computer became feasible in the early 1970s, the idea of a portable personal computer followed. A *"personal, portable information manipulator"* was imagined by Alan Kay at Xerox PARC in 1968(Maxwell, 2006) and described in his 1972 paper as the "Dynabook" (Kay, 1972). The IBM SCAMP project (Special Computer APL Machine Portable), was demonstrated in 1973. This prototype was based on the PALM processor (Put All Logic In Microcode). The IBM 5100, the first commercially available portable computer, appeared in September 1975, and was based on the SCAMP prototype(IBM 5100 computer). As 8-bit CPU machines became widely accepted, the number of portables increased rapidly. The Osborne 1, released in 1981, used the Zilog Z80 and weighed 23.5 pounds (10.7 kg). It had no battery, a 5 inch (13 cm) CRT screen and dual 5.25 inch (13.3 cm) single-density floppy drives. In the same year, the first laptop-sized portable computer, the Epson HX-20, was announced(Epson SX-20 Promotional Brochure). The Epson had a LCD screen, a rechargeable battery and a calculator-size printer in a 1.6 kg (3.5 lb) chassis. Both Tandy/RadioShack and HP also produced portable computers of varying designs during this period(Tandy/Radio Shack model 100 portable computer, Hewlett-Packard model 85). The first laptops using the flip form factor appeared in the early 1980s. The Dulmont Magnum was released in Australia in 1981-82, but was not marketed internationally until 1984-85. The $8150 GRiD Compass 1100, released in 1982, was used at NASA and by the military among others. The Gavilan SC, released in 1983, was the first notebook marketed using the term *"laptop"*(Gavilian SC computer). From 1983 onwards, several new input techniques were developed and were included in laptops, including the touchpad (Gavilan SC, 1983), the pointing stick (IBM ThinkPad 700, 1992) and handwriting recognition (Linus Write-Top 1987). Some CPUs were designed specifically for low-power use such as laptops (Intel i386SL, 1990) and were supported by dynamic power management features (Intel SpeedStep and AMD PowerNow!) in some designs. Displays reached VGA resolution by 1988 (Compaq SLT/286) and 256-color screens by 1993 (PowerBook 165c), progressing quickly to millions of colors and high resolutions. High-capacity hard drives and optical storage (CD-ROM followed by CD-R and CD-RW and eventually by DVD-ROM and the writable varieties) became available in laptops soon after their introduction to the desktops.

CLASSIFICATION OF LAPTOPS

The general term *"laptop"* can be used to refer to a number of classes of small portable computers: (Types of Laptops: How Do You Compute, Laptop Buying Guide).

❁ **Notebook :** A laptop PC, which measures at least 11 inches across, is the minimum width to allow for a full-size keyboard. The first Notebook PC's were the size of a standard U.S. *"A size"* notebook piece of paper (8-1/2 x 11 inches), but later *"A4-size"* Notebook PC's were introduced, which were the width of a standard European "A4" notebook piece of paper (297 mm, or about 11.7 inches wide), and added a vertical column of keys to the right and wider screens.

❁ **Sub-Notebook or Netbook :** A laptop PC which is less than 11 inches wide, which means it has less than a full-size keyboard (measured in percentage of full-size, such as 92%), and therefore, also less display screen width, compared to a Notebook PC. It also is usually lower cost, more lightweight, and has less features than a Notebook PC. The tradeoff is that a smaller than full-sized keyboard can be more difficult to operate, especially if you have larger hands.

❁ **Ultra-thin Laptop :** A newer class of laptops, which are very thin and lightweight.

❁ **Tablet PC :** Has a small, *"calculator-type" or "chiclet"* keyboard, and/or touch-screen interface.

❁ **Rugged :** Engineered to operate in tough conditions (strong vibrations, extreme temperatures, wet and dusty environments).

FEATURES OF LAPTOPS

❁ **Processor:** The brain of a computer - and its most expensive component- is the central processing unit which is a credit-card-size electronic device **(Hunton, 1996)**.The fastest are based on Pentium-class electronic chips. Speeds (also called clock rates) of laptops could be in the range of 2.66 GHz. In general, faster is better, but it's also more

expensive. The laptop processor is typically a lower-powered processor than those found in similar desktop machines, although some laptop makers have used desktop processors in their laptops to get a performance edge. Processors designed for mobile computing generally consume less power, and thus, run cooler than desktop processors. This is important because you want your battery to last a long time and you also don't want to burn a hole through your lap. Desktop PCs typically have massive heat-sinks and fans to cool them down, but it's hard to fit that stuff into a tiny laptop, and fans drain laptop batteries quickly. Performance characteristics that differentiate laptop CPUs include the amount of cores they contain, the cache memory, and bus speed- as well as the speed of the chip itself. Mainstream processors are moving toward containing dual cores. You can still get single core CPUs today, but there are performance benefits to dual-core, even if they are not huge. Cache memory is speedy local memory that allows the CPU to keep from accessing slower main memory as often, and bus speed determines how fast the processor talks to the rest of the computer.

❁ **Power Considerations:** Today's notebook CPUs are somewhat different from their desktop counterparts, especially in their electrical design. Because they are portable and therefore battery-dependent, laptop CPUs are engineered to run on less voltage and to be miserly in using the available stored electricity. For example, notebook CPUs can be programmed to recognize when their workload is light, alerting them to go into an electricity-saving idle mode; once the workload increases (when you evoke an application or save a file to disk), idle switches to full power. Laptop CPUs also can turn off other electricity-draining components - such as sound and the modem- when they are not being used. In addition, most laptops have other programmable power-conservation features that can be toggled to different defaults. To recharge their batteries, or to run off wall-socket alternating current (AC) power, laptops come with small electrical transformers that convert the AC power to a battery's direct current (DC). Most notebooks use an external AC adapter - sometimes called a power brick because it's usually shaped like a small brick. The bricks have to be carried with the computer for recharging. However, some laptops have a built-in AC power adapter - a decided advantage because there is less to carry.

❁ **Batteries**: Yesterday's laptops featured Ni-Cad (Nickel-Cadmium) batteries, which poisoned the environment when disposed of improperly, didn't offer much up-time (comparatively), and had the annoying habit of remembering how long you had used them and refusing to work any longer the next time. Then there were NiMH (Nickel-Metal-Hydride) batteries; they offered longer life, better efficiency, and no memory problems. The current generation of laptops still uses Lithium Ion batteries. These batteries offer a gain in efficiency over NiMH batteries, with an extremely low discharge rate (long shelf life when charged) and efficiency improvements over Lithium Ion batteries; movement towards new battery technology has slowed, however. Even though improvements are made, we are getting to the point where packing so much energy into a tiny space is getting a bit dangerous. Some laptops claim up to 5 hours worth of up-time on one battery- take this figure with a grain of salt. That's probably how long the battery would last if you put on the blank-screen screen saver and didn't touch it for 5 hours. Expect more in the range of two or three hours per stock battery under continual use. If you plan to be on flights, trains, or buses for 10 hours at a time, buy some extra batteries, make sure you have a power plug handy, or make sure you get a model that has a nice add-on battery feature that can hold a lot of juice.

❁ **Screens**: There generally are two types of laptop screens: The less expensive and less attractive is a passive-matrix, dual-scan screen; the more expensive and higher quality one is an active-matrix screen, which produces more accurate colors, greater contrast and wider viewing angles. Although screen sizes range from about 9 inches to 12 inches, the larger screen is becoming standard. If you use your notebook for presentations and it has a 640 x 480 VGA (an industry designation for screen design) resolution, in most cases, that is the best quality you can get through the projector or the light panel. However, if you opt for the higher quality 800 x 600 SVGA resolution, presentation quality will be considerably enhanced, but you'll pay more for it. Also, seek a machine with a local bus video (a direct pathway, or bus, to the screen); it enhances the computers graphics performance. While there is much research focusing on screen technology - mostly to make the screens thinner and more power efficient- it will take a major breakthrough to improve on the current active-matrix screens. Even the best active-matrix screens lack the sharpness and refresh rate (the ability to display fast motion without delay and blur) of desktop screens.

❁ **Hard Disks:** The data storage capacity of notebooks has increased considerably over the past few years. With Windows XP, you'll want a bare minimum of 512 MB of memory. For Vista, a minimum of 1 GB is recommended, as you need that to turn on all the advanced features- not that you have to turn them or would want to, as you may find that

they slow down your laptop too much. The current sweet spot for laptop memory modules is 2 GB; if you go for 4 GB modules, they are extremely expensive and not yet worth it for most users. Purchase a hard disk that meets your needs; bigger is not necessarily better. There are cheaper options: Some of the newer laptops allow users to snap out one hard disk and replace it with another.

❁ **Optical Drives:** Most laptops have some sort of DVD or CD-RW (CD writeable) drive built into the laptop itself. Because of the tight space constraints, some smaller laptops offer an accessory slot where you can swap the optical drive with a spare battery or other accessory. Even smaller laptops don't have any internal drives at all. An internal DVD drive is very handy and, is a worthy trade-off for a bit more weight and size.

❁ **Networking:** Many laptops offer built-in modems. Most laptops today come with V.92 modems. Get built-in 10/100/1000 Ethernet in your laptop. It's the standard non-wireless way to connect to a DSL modem, cable modem, a corporate network, or the lame wired network at the mediocre hotel you happen to be staying at. Network cables plug into the RJ-45 connector on your laptop. Almost all laptops ship with a 10/100/1000 Gigabit Ethernet port nowadays. Typical wireless laptop technologies today are 802.11a/b/g (Wi-Fi) and BlueTooth. There is also the emerging 802.11n standard, which promises longer range and faster throughput than the previous standards. Most laptops feature a built-in antenna, and the manufacturers offer an add-in card that handles a specific wireless connectivity.

❁ **Multimedia:** Many notebooks are designed to handle a variety of multimedia applications. In addition to CD-ROM drives, sound boards and video-compression capability (called MPEG, and pronounced m-peg) are becoming standard features. Multimedia laptops also come with built-in stereo speakers and a microphone..

❁ **Pointing Devices:** There are three types of pointing devices available on notebooks: integrated (built-in) trackballs (an upside-down mouse), touchpads (the controlling finger moves on a built-in flat, pressure-sensitive surface) and integrated pointing sticks (a small movable button usually situated between the^ and *h* keys). Some models come with an integrated pointing stick and either a trackball or touchpad. Often the trackball and touchpad are interchangeable. It is difficult to recommend one pointing device over the other, since this decision is very subjective.

❁ **Expansion Slots:** The workhorse peripherals of laptops are credit-card-size cards (dubbed PCMCIA cards) that are snapped into the computer's expansion slots, which are usually situated in the side or back of the laptop. They serve many different functions: fax/modems, solid-state hard disks, local area network (LAN) adapters, sound generators and many more. They come in three standard designs and the technology is rather complex. Suffice it to say that for maximum flexibility, be sure your laptop contains an expansion slot that can handle either a Type II or Type III card; the Type III card provides the most flexibility but is also more expensive. Type III cards will fit in a Type II slot, but not vice versa.

❁ **Modularity:** Many manufacturers design their laptops with the greatest flexibility. For example, a single bay (a large slot inside the computer) can handle a spare battery, a floppy drive, a hard drive or a CD-ROM drive. These components can be switched as needed, so a user can tailor the configuration to suit the immediate situation. Modular bays also can serve as a way to upgrade, say, to a faster CD-ROM or a larger hard drive.

Other features to consider:

❁ **Ports:** Look for at least one each of the following ports: parallel, serial, external monitor and PS2. Some notebooks have a built-in SCSI II port, which greatly enhances the ability to add on other peripherals.

❁ **Port Replicator:** This great feature allows you to connect, say, a printer, a LAN connector card, an external monitor and a desktop mouse into one side of the replicator, while the notebook plugs it into the other side. In this way, you can quickly plug and unplug the notebook into the replicator, without messing with all of the device connections.

❁ **Carrying Case:** Invest in a strong, well-padded case. It allows room to carry extra components and provides protection against those inevitable bumps.

❁ **Docking Station :** Much like port replicators, docking stations can do even more. For example, one can hold extra slots for expansion cards and additional drives (hard, floppy and CD-ROM).

RESEARCH OBJECTIVES

The primary objective of the study is to find out the consumer perception towards the various laptop brands. Secondary objectives of the study are :

a) To analyze the top of mind awareness of different brands;

b) To find out the gap between top of mind awareness and the brands used;
c) To analyze the brand switching habits of the consumers ;
d) To find out the importance and satisfaction level, with respect to the parameters, for all the brands;
e) To find out if there is any relationship between the characteristics of the consumers and brand that they use;
f) To find out the different uses of laptops.

RESEARCH METHODOLOGY

The study is descriptive in nature as the characteristics (who, why, how, when and where) of the respondents are studied in detail here. It is preliminary in nature and can be taken up for further research. It was conducted in the city of Mumbai and Navi Mumbai. A questionnaire-based survey was administered to the consumers of laptops. The sample size taken was 75 respondents. The sampling technique used was judgmental sampling. The survey was conducted from May 2010 to July 2010.

LITERATURE REVIEW

The Indian laptop industry has been witnessing a boom in recent times **(Ray, 2009)**. Apart from the rapidly falling prices of laptops and new technologies being packed into ultra-slick laptops, the entry of non-traditional players to develop wireless infrastructure has given the market a further boost. For instance, a few years ago, wireless connectivity in the laptop was considered to be a luxury. Today, it has become a necessity with major hospitality chains in India establishing wireless hotspots. Also, many firms, airports and even schools are planning/or have implemented WiFi. International Data Corporation (IDC) - the premier global provider of market intelligence, advisory services, and events for information technology, telecommunications, and consumer technology markets - inferred that India is the third fastest growing laptop market in the Asian region, with a compound annual growth rate of 21.9 percent. Those numbers match IDC India's forecast for the PC market, since it has projected a growth of 22.2 percent for the Indian PC market in 2003 (IDC, 2004 and 2005). While many factors can be credited to this surge in the laptop segment, the biggest driver is probably the fact that businesses are posting healthy numbers and have started encouraging their employees to work from home. Today, even non-IT companies are giving laptops to their executives in a bid to boost productivity. The spurt in laptop usage can also be attributed to the increasing usage of IT and the automation of the sales force in sectors like pharmaceuticals, Fast Moving Consumer Goods (FMCG) and services, and in government offerings **(Chris Long, 2005)**. The real opportunity, however, lies in exploiting the market to its fullest potential. For instance, the Indian market for laptops and handheld devices is still small compared to other Asian countries. According to Rajiev Grover, Business Manager, Mobile Products, HP India, laptop sales account for only 2 percent in India whereas, the corresponding figures for Thailand, Korea and Australia are 10, 15 and 20 percent respectively **(Tzeng and Shen, 2005 and MIC, 2005)**. The market dynamics of PCs and laptops are different. Two-thirds of PC sales come from white-box manufacturers. There are no such manufacturers for laptops. The laptop market has done well in comparison to sales of branded PCs from the Indian and MNC vendors, which shows sales figures of 60,000 laptops against 700,000 for branded PCs (Newsletter from Acer India, 2004). Companies are trying hard to differentiate their products, despite various standardizations like Centrino. Security features like biometric technologies are being built into laptops. Acer offers a fingerprint sensor built into the laptop's palm rest. Besides the price factor, vendors have also customized their laptops depending on user profile. For instance, corporate professionals typically prefer features like wireless connectivity, long battery life, low weight and flexible configurations. However, students or Small Office Home Office (SOHO) customers prefer features like enhanced sound and video capabilities, higher storage space, and larger screen size. In addition to targeting traditional sectors like corporates, many players are targeting non-IT users like doctors, lawyers and CAs and the home and SOHO users. In order to further encourage users, many of them are offering easy finance and insurance schemes as well. Therefore, it becomes pertinent for the manufacturer to understand the exact customer requirements, and thereby, adapt accordingly. Introducing a plethora of offers and lucrative schemes does not always ensure a larger customer base or a larger market share. The manufacturer should also understand customers' perceptions about the company, i.e., gauge the company's image in the customer's mind, and then there should be an effort to match the requirements with the image. This will lead to better and effective marketing strategies, rather than focusing solely on attractive new technology **(Ray, 2009)**.

ANALYSIS

Objective 1: Top of mind awareness (only the first 3 brand names recollected are taken here).

Table 1 : Top Of The Mind Awareness

SL. NO	NAME OF BRAND	TOP OF THE MIND 1	TOP OF THE MIND 2	TOP OF THE MIND 3
1	Dell	31	15	05
2	HP	22	19	12
3	Sony	04	04	10
4	Compaq	03	06	06
5	Lenovo	03	06	07
6	IBM	03	02	01
7	Apple	02	01	04
8	HCL	02	00	04
9	Acer	00	10	06
10	Toshiba	01	02	03
11	Zenith	01	01	01
12	Alienware	01	00	00
13	Mac	01	00	01
14	Asus	00	00	03

From the above Table 1, we can see that Dell computers have the highest brand memory, followed by HP. 41% of the people remember Dell as the first brand, followed by HP. Sony also is doing well as people remember it as the third brand. Other brands have to improve their communication programs so that their names are heard and remembered.

Objective 2: To find out the gap between top of mind awareness and the brand used (only first two brand names are taken here).

Table 2: Top Of Mind Awareness 1 And Laptop Used Currently (Rows Represent Top Of The Mind And Columns Represent Usage)

Brand	HP	Acer	Compaq	Dell	Lenovo	Sony	Toshiba	Fujitsu	Zenith	Asus	Total
Mac	0	0	0	1	0	0	0	0	0	0	1
Alienware	1	0	0	0	0	0	0	0	0	0	1
IBM	1	0	0	2	0	0	0	0	0	0	3
Zenith	0	1	0	0	0	0	0	0	0	0	1
HCL	0	1	1	0	0	0	0	0	0	0	2
Apple	1	0	0	1	0	0	0	0	0	0	2
Toshiba	0	0	0	1	0	0	0	0	0	0	1
Sony	1	0	0	1	0	2	0	0	0	0	4
Lenovo	0	0	0	2	1	0	0	0	0	0	3
Dell	0	3	2	19	2	0	2	1	1	1	31
Compaq	0	0	2	1	0	0	0	0	0	0	3
Acer	0	1	0	0	0	0	0	0	0	0	1
HP	12	2	3	1	3	0	0	0	0	1	22
Total	**16**	**8**	**8**	**29**	**6**	**2**	**2**	**1**	**1**	**2**	**75**

From the above Table 2, it can be seen that Dell computers are the ones who are able to convert brand recall to actual purchase (19 out of 31), HP being the next one with 12 out of 22. The other laptop shares are less and so are not considered.

Table 3: Top Of Mind Awareness 2 And Laptop Used Currently

Brand	HP	Acer	Compaq	Dell	Lenovo	Sony	Toshiba	Fujitsu	Zenith	Asus	Total
IBM	0	0	0	0	0	0	0	0	0	2	2
Zenith	0	0	0	0	1	0	0	0	0	0	1
Fujitsu	0	0	1	0	0	0	0	1	0	0	2
Apple	0	0	0	1	0	0	0	0	0	0	1
Toshiba	0	0	0	1	0	0	1	0	0	0	2
Sony	1	0	0	2	1	0	0	0	0	0	4
Lenovo	1	1	1	1	2	0	0	0	0	0	6
Dell	5	1	2	7	0	0	0	0	0	0	15
Compaq	3	1	1	1	0	0	0	0	0	0	6
Acer	0	3	1	4	1	1	0	0	0	0	10
HP	4	0	1	11	1	1	0	0	1	0	19
Total	**14**	**6**	**7**	**28**	**6**	**2**	**1**	**1**	**1**	**2**	**68**

From the above Table 3, it can be seen that Dell computers are the ones who are able to convert brand recall to actual purchase (7 out of 15 for second brand name). Also, for HP, though 11 people out of 19 remember HP as the brand name, they actually buy DELL. This is not good for the market share of HP. The other companies are not considered as the values are very less.

Objective 3: To analyze the brand switching habits of the consumers.

Table 4 : Laptop Used Currently Vs Brand Used Earlier (Laptop Used Earlier)

Brand	HP	Acer	Compaq	Dell	Lenovo	Sony	IBM	Total
Asus	1	0	1	0	0	0	0	2
Lenovo	1	0	1	1	0	1	0	4
Dell	2	1	0	1	1	0	0	5
Compaq	1	0	1	0	0	0	1	3
Acer	0	0	0	0	1	0	1	2
HP	2	0	0	0	1	0	1	4
Total	**7**	**1**	**3**	**2**	**3**	**1**	**3**	**20**

From the above Table 4, we can see that 20 people out of 75 have gone for the second brand. In this, 7 people have gone for HP as the brand, 2 out of which had used HP earlier. So, that means 5 people have switched from other brands to HP.

Table 5 : Importance And Satisfaction Level Of Different Features

Feature	Importance rating	Satisfaction rating
Display size	3.81	4.10
Processors	4.44	4.01
HDD Capacity	3.97	3.99
Optical Drive	3.61	3.76
Wi-fi connectivity	4.03	4.04
Bluetooth	3.61	3.81
Battery Life	4.49	3.58
Weight	3.83	3.47
Speaker system	3.82	3.46
RAM	4.33	3.81
Pointing Device (Touchpad /Point Stick/Dual Point)	3.81	3.71
Price	4.23	3.5
Service Contract	3.99	3.45
Warranty	3.94	3.54
Offers	3.28	3.21

This is good for the brand as it is able to connect with people.

Objective 4: To find out the importance and satisfaction level, with respect to the parameters, for all the brands . We can see from the Table 5, that Battery life, Processor capacity, RAM, Price and Wi-Fi connectivity are the most important parameters. In these, the overall satisfaction is least in case of pricing and battery life. These are the areas where laptop companies need to concentrate and improve.

Objective 5: To find out if there is any relationship between the characteristics of the consumers and brand that they use.

Table 6 : Factor Analysis-Rotated Component Matrix Component

Features	1	2	3	4	5	6	7	8
I buy a laptop based on its features.	-4.766E-02	7.401E-02	5.561E-02	0.786	-3.509E-02	-5.228E-02	0.303	0.199
Discounts and schemes are a definite incentive to buy a laptop.	-6.03E-02	-6.705E-02	-0.3	0.644	-1.062E-02	0.266	0.113	0.148
I think car is a necessity rather than a luxury.	0.202	0.246	0.156	0.653	0.107	-1.108E-02	-0.337	-0.37
I would be interested in a new brand of laptop.	-2.662E-03	-3.718E-02	-1.246E-02	4.5E-02	0.811	3.177E-02	3.534E-02	5.193E-02
I frequently watch new advertisements of new brands of laptops.	2.25E-02	0.194	0.209	0.141	0.29	0.154	-6.3E-02	0.517
I often go out for dinner/lunch.	3.455E-02	0.148	0.784	0.109	7.563E-02	-7.93E-03	0.267	8.16E-02
I do like using public transport.	0.114	-0.104	-0.111	8.67E-02	-0.136	-0.12	0.117	0.857
I prefer watching only English movies.	0.3	9.94E-02	0.135	0.137	-0.246	0.171	0.575	0.129
I like to eat at expensive restaurants/hotels.	0.354	0.62	8.02E-02	4.17E-02	9.58E-02	-0.154	0.271	-0.219
I like to wear only branded clothes.	0.81	0.575	-1.209E-02	-0.172	-9.62E-02	3.73E-02	-5.19E-02	0.162
I like using branded accessories (bags, watches).	0.871	1.708E-02	0.113	0.137	2.612E-02	-5.67E-02	0.182	-3.56E-02
I shop only at branded/ exclusive outlets.	0.714	0.259	-0.178	8.23E-03	-9.14E-03	0.316	5.02E-02	9.44E-02
I am a fashion conscious individual.	0.415	0.363	0.203	0.166	-0.258	0.432	-2.45E-02	-0.201
I prefer paying by credit card rather than by cash.	-7.45E-02	0.704	-0.308	0.17	-0.253	4.83E-02	0.117	-5.536E-02
I go out partying/clubbing often.	0.233	0.643	0.22	-0.186	0.106	0.106	-3.37E-02	0.302
I frequently go out on weekends.	-7.81E-02	0.135	0.785	-0.143	-7.02E-02	7.21E-02	-6.96E-02	-6.688E-02
I travel abroad for a vacation once a year.	9.3E-02	0.616	0.316	-7.33E-02	0.239	0.272	-1.61E-02	0.12
I travel by air for holidays.	0.195	0.667	0.286	0.146	4.15E-02	3.77E-02	-3.77E-02	-7.41E-02
I own the latest electronic gadgets (mobiles, iPods).	5.488E-02	0.123	-1.19E-02	-6.99E-02	-4.42E-02	0.802	0.282	-4.28E-02
I prefer writing an email rather than a letter.	4.04E-02	-0.102	-1.86E-02	3.49E-02	-0.782	-5.69E-02	2.097E-02	5.886E-02
I like to go to a gymnasium and keep myself fit and healthy.	0.106	-4.82E-02	0.134	0.272	0.253	0.633	-0.18	8.48E-02
I prefer to wait till my brand is available.	0.451	0.135	-0.12	-1.09E-02	0.187	0.412	0.319	-8.18E-02
I refer my brand to others.	4.32E-02	2.87E-02	5.41E-02	0.101	0.107	5.47E-02	0.87	1.15E-02

Table 7 : Factor Loading Matrix From Rotated Component Matrix

Feature	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8
I buy a laptop based on its features.				0.786				
Discounts and schemes are a definite incentive to buy a laptop.				0.664				
I would be interested in a new brand of laptop.					0.811			
I frequently watch new advertisements of new brands of laptops.								0.517
I often go out for dinner/lunch.			0.784					
I think car is a necessity rather than a luxury.				0.653				
I do like using public transport.								0.857
I prefer watching only English movies.							0.575	
I like to eat at expensive restaurants/hotels.		0.62						
I like to wear only branded clothes.	0.81							
I like using branded accessories (bags, watches).	0.871							
I shop only at branded/ exclusive outlets.	0.714							
I am a fashion conscious individual.						0.432		
I prefer paying by credit card rather than by cash.		0.704						
I go out partying/clubbing often.		0.643						
I frequently go out on weekends.			0.785					
I travel abroad for a vacation once a year.		0.616						
I travel by air for holidays.		0.667						
I own the latest electronic gadgets (mobiles, iPods).						0.802		
I prefer writing an email rather than a letter.					-0.782			
I like to go to a gymnasium and keep myself fit and healthy.						0.633		
I prefer to wait till my brand is available.	0.451							
I refer my brand to others.							0.87	

From the rotated component matrix and the factor loading, we can see that factors 3,5,7 and 8 have 3 or less variables with them and so they can be neglected. (According to *Practical Assessment& Research Evaluation,* Volume 10, Number 7, July 2005 ISSN 1531-7714). The neglected parameters are - I frequently go out for dinner/lunch., I frequently go out on weekends., I would be interested in a new brand of laptop., I prefer writing an email rather than a letter., I prefer watching only English movies., I refer my brand to others., I frequently watch new advertisements of new brands of laptops and I do like using public transport.

Table 8: Cluster Analysis Using Hierarchial Clustering

	Cluster	Combined	Coefficients	Stager First	Cluster Appears	Next Stage
Stage	Cluster 1	Cluster 2		Cluster 1	Cluster 2	
1	25	55	.000	0	0	15
2	41	78	3.000	0	0	17
3	31	43	4.000	0	0	16
4	11	17	5.000	0	0	24
5	33	60	6.000	0	0	33
6	30	54	6.000	0	0	19
7	29	53	6.000	0	0	8
8	29	36	7.000	7	0	19
9	14	84	8.000	0	0	22
10	8	76	8.000	0	0	24

11	50	74	8.000	0	0	43
12	22	73	8.000	0	0	23
13	45	71	8.000	0	0	28
14	42	59	9.000	0	0	34
15	25	38	9.000	1	0	52
16	7	31	9.000	0	3	29
17	41	62	9.500	2	0	31
18	13	27	10.000	0	0	36
19	29	30	10.333	8	6	34
20	21	81	11.000	0	0	38
21	52	67	11.000	0	0	35
22	14	37	11.000	9	0	48
23	22	82	12.000	12	0	49
24	8	11	12.000	10	4	37
25	9	80	13.000	0	0	47
26	2	79	13.000	0	0	50
27	51	66	13.000	0	0	51
28	45	56	13.000	13	0	45
29	7	58	14.000	16	0	48
30	40	49	14.000	0	0	41
31	41	44	14.333	17	0	39
32	57	77	15.000	0	0	43
33	33	61	15.000	5	0	46
34	29	42	15.100	19	14	38
35	52	65	15.500	21	0	42
36	13	26	16.000	18	0	49
37	8	28	16.250	24	0	42
38	21	29	16.357	20	34	46
39	41	75	17.250	31	0	53
40	68	85	18.000	0	0	67
41	34	40	18.000	0	30	56
42	8	52	18.400	37	35	54
43	50	57	19.000	11	32	70
44	16	47	19.000	0	0	60
45	10	45	19.000	0	28	55
46	21	33	19.444	38	33	51
47	9	24	19.500	25	0	53
48	7	14	20.167	29	22	54
49	13	22	20.556	36	23	58
50	2	20	21.500	26	0	58
51	21	51	22.250	46	27	52
52	21	25	22.857	51	15	60
53	9	41	22.933	47	39	57
54	7	8	23.607	48	42	57
55	6	10	23.750	0	45	62
56	34	35	24.667	41	0	64
57	7	9	25.450	54	53	61
57	7	9	25.450	54	53	61
58	2	13	25.833	50	49	61
59	12	39	27.000	0	0	65

60	16	21	27.618	44	52	62
61	2	7	29.092	58	57	63
62	6	16	29.253	55	60	63
63	2	6	34.068	61	62	64
64	2	34	34.938	63	56	66
65	12	23	39.500	59	0	66
66	2	12	40.794	64	65	68
67	68	69	45.000	40	0	69
68	2	18	46.286	66	0	69
69	2	68	50.396	68	67	70
70	2	50	59.810	69	43	0

From the above agglomeration schedule, when we calculate the differences of coefficients, we get the following values (59.81-50.4=9.41, 50.4-46.3 = 3.9) the difference is highest for one cluster solution, but then we can take 2-cluster solution or 4. 2 cluster solution is adequate and so the values are given below.

Table 9: Clustering Using K-Means

Case Number	laptop used currently	Cluster	Distance
1	.	.	.
2	.	1	4.043
3	.	.	.
4	.	.	.
5	.	.	.
6	HP	1	3.858
7	HP	1	3.467
8	HP	2	4.383
9	HP	2	3.553
10	HP	1	4.876
11	HP	1	3.525
12	HP	2	4.624
13	HP	2	3.738
14	HP	2	3.268
15	HP	.	.
16	HP	1	4.798
17	HP	1	3.730
18	HP	2	5.211
19	HP	.	.
20	HP	1	3.693
21	HP	1	3.348
22	ACER	2	3.286
23	ACER	1	4.890
24	ACER	2	3.469
25	ACER	1	3.420
26	ACER	2	3.268
27	ACER	2	3.286
28	ACER	1	3.697
29	ACER	1	2.222
30	ACER	1	3.096
31	COMPAQ	2	3.400
32	COMPAQ	.	.
33	COMPAQ	1	2.841
34	COMPAQ	1	4.597
35	COMPAQ	1	4.865
36	COMPAQ	1	1.865
37	COMPAQ	2	4.077
38	COMPAQ	1	4.235
39	COMPAQ	2	4.410
40	COMPAQ	1	3.766
41	DELL	2	1.856
42	DELL	1	2.803
43	DELL	2	3.204
44	DELL	2	4.070
45	DELL	1	3.092
46	DELL	.	.
47	DELL	1	4.504
48	DELL	.	.
49	DELL	1	3.823
50	DELL	2	5.344
51	DELL	1	3.295
52	DELL	2	3.469
53	DELL	1	2.519
54	DELL	1	2.593
55	DELL	1	3.420
56	DELL	1	4.383
57	DELL	2	3.643
58	DELL	1	2.972
59	DELL	1	2.903
60	DELL	1	2.486
61	DELL	1	3.726
62	DELL	2	3.357
63	DELL	.	.
64	DELL	.	.
65	DELL	2	3.519
66	DELL	1	3.701
67	DELL	2	3.357

68	DELL	2	5.844
69	DELL	1	6.240
70	DELL	.	.
71	LENOVO	1	3.548
72	LENOVO	.	.
73	LENOVO	2	4.476
74	LENOVO	2	4.694
75	LENOVO	2	4.148
76	LENOVO	2	3.816

77	SONY	2	5.372
78	SONY	2	2.256
79	TOSHIBA	2	3.907
80	TOSHIBA	2	2.976
81	FUJITSU	1	3.328
82	ZENITH	2	3.722
83	ZENITH	.	.
84	ASUS	2	2.803
85	ASUS	2	3.885

Table 10: Brands In Each Cluster

Brand	No.Of Respondents In Cluster 1	No.Of Respondents Cluster 2
HP	8	6
DELL	15	10
ACER	5	4
COMPAQ	6	3
LENOVO	1	4
SONY	0	2
FUJITSU	1	0
ZENITH	0	1
ASUS	0	2

Table 11: Final Cluster Centres

Feature	Cluster 1	Cluster 2
I buy a laptop based on its features.	4.33	4.41
Discounts and schemes are a definite incentive to buy a laptop.	3.73	3.48
I would be interested in a new brand of laptop.	2.78	2.96
I frequently watch new advertisements of new brands of laptops.	2.65	3.26
I often go out for dinner/lunch.	2.85	3.67
I think car is a necessity rather than a luxury.	3.4	3.78
I do like using public transport.	3.35	3.59
I prefer watching only English movies.	2.23	3.04
I like to eat at expensive restaurants/hotels.	1.98	2.93
I like to wear only branded clothes.	2.38	3.33
I like using branded accessories (bags, watches).	2.65	3.41
I shop only at branded/ exclusive outlets.	2.17	3.04
I am a fashion conscious individual.	2.38	3.56
I prefer paying by credit card rather than by cash.	2.5	3.26
I go out partying/clubbing often.	1.7	2.78
I frequently go out on weekends.	2.98	3.52
I travel abroad for a vacation once a year.	1.93	3.33
I travel by air for holidays.	2.2	3.56
I own the latest electronic gadgets (mobiles, iPods).	2.75	3.59
I prefer writing an email rather than a letter.	4.38	4.11
I like to go to a gymnasium and keep myself fit and healthy.	2.93	3.74
I prefer to wait till my brand is available.	2.8	3.78
I refer my brand to others.	3.48	4

No.Of Cases In Each Cluster

Cluster Number	Number of Respondents
1	37
2	34
Total	**71**

Some of the respondents are not in any cluster as they may not have answered the questions. The above tables show the general cluster solutions. Here, the number of respondents are almost the same as seen from the number of case tables. From the final cluster table, we can see that the first cluster people buy laptops based on features and they don't spend on expensive restaurants. They don't travel abroad often and they need not shop only at branded outlets. They don't like to go out for partying. The case is different for cluster 2. They are more brand conscious and they travel abroad more often. They are almost opposite in characteristics to the first cluster. We can also see from the cluster membership table, the number of respondents of major brands in each cluster.

Objective 6: Main Uses of Laptops

Table 12: Uses Of Laptops(Use 1, 2 And 3 According To The Order)

A)USE 1

Use	Number of Respondents
Education	26
Business	23
Gaming	20
Browsing	7
Total	**76**

B)USE 2

Use	Number of Respondents
Education	31
Browsing	21
Business	10
Movies	1
Total	**63**

C)USE 3

Use	Number of Respondents
Browsing	24
Education	10
Movies	9
Business	2
Gaming	1
Total	**46**

We can see from the above tables that education and browsing are the most important uses of laptops

FEATURES DISLIKED

The table below shows the basic features disliked by the respondents and the number of respondents disliking the same features for each of the brands.

Table 13: Features Disliked In Brands

FEATURE DISLIKED	HP	DELL	ACER	COMPAQ
Features and Style	2	2	1	2
Service	2	1	1	1
Cost	3	4	1	0
Battery Life	5	1	5	1
Heating	2	0	0	1
Weight	1	0	1	1

RECOMMENDATIONS

We can see from the above tables that battery life is a major problem for most of the companies. Companies like Dell has to reduce the price. Education and browsing are found to be the most important uses of laptops and so companies have to concentrate on these parameters. Also companies like DELL and HP have to concentrate more on the features side, whereas, other companies like LENOVO have to concentrate on other factors also.

CONCLUSION

The study finds out the market of different brands in the laptop industry and the difference between brand name identification and the brand chosen. Also, the study finds out the different parameters useful for choosing different laptop brands. The uses of laptops are also studied in this article. The study is an attempt to find out the different areas where laptop companies can improve, so that they can penetrate the market further. **(Contd. On Page 60)**

multiple platforms, is customer driven and is evaluated on an ongoing basis to determine if alterations are needed. When these elements are not present, the chance of rebranding success diminishes rapidly.

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