

# INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT & MANAGEMENT

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**TECHNOLOGICAL DRIFT TOWARDS SMART DEVICES: AN OVERVIEW**

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**ABSTRACT**

Technology landscape is the major changing factor in all industry with the outlook of technology evolution in the field of electronics & communication; we are witnessing the turnarounds of firms ranking in this industry. Computers and mobile phones are viewed as two different industries which combined to deliver smart devices like smartphones and tablets have taken over the laptops and desktops business. With this technological change, we see new players like Google, Samsung and Apple replacing the dominance of Microsoft and Nokia. The firm with superior technology and suitable strategy to match the new technology will be at front end. Still the smart devices industry is in evolutionary stage most of the firms bet on upcoming technologies to lead the market.

**KEYWORDS**

Smart device, Technological changes, Business strategies.

**INTRODUCTION**

Change is occurring at an accelerating rate; today is not like yesterday, and tomorrow will be different from today. Continuing today's strategy is risky; so is turning to a new strategy" -Philip Kotler.

Shift in technology and device preference, like shifting trend of customers' from desktop to laptops (a process that began in early 2000), similarly the technological drift from laptops to smart devices has created an opportunity for companies like Google and Apple.

Technology is one of the constant driving force in the way organizations work. Indeed whole business operation can be traced through technology change. With the combination of electronic & communication and information technology has changed the complexity in consumer preference and adoption of technology, this also enable individual and small firm to afford technology once limited to large organization and to vary their mode and place of work. This give rises to new strategic thinking and handling the business. New technology always provides the edge for innovator or early adopter in terms of handling consumer and competitors.

Similarly the introduction and innovation of new technology has changed the traditional business operation strategy and tactic, along with the technology changes business strategy are also changed with time. Innovation of computer and software has given rise to new business operation strategy that constantly changed and evolved with the change in technology from computers – laptops – Smartphone's and tablets. The firm which is capable to foresee in technology change and change the business operational strategies can win the race.

Heavily guarded OS (operating system software) market by Microsoft not left a single window for any competitors since from the inception with a strong market share of 98.43% in desktop and PC segment but fail to make its impact in Smartphone and tablet segment with market share of only 1.21% and adding with the and added with increasing trend in sales of Smartphone and tablets, recent sales figure showing steep fall in laptop and desktop sales over Smartphone and tablet sales with Global shipments of Smartphone's, tablets, and laptops hit 308.7 million in the first quarter of 2013, with 216.3 million Smartphone's, 50.5 million laptops, and 41.9 million tablets shipped, according to the latest numbers from Canalsys. Google's Android accounted for 75.6 percent of all Smartphone shipments. With these rapid advances going on and the prediction in December, 2012 by Mary Meeker that the installed base of smartphones and tablets will exceed the total PC installed base by the 2nd quarter of this year, market researchers are releasing forecasts more frequently than ever. Smartphone and tablet ready to take over the PC and desktop the shift in technology give the window for competitor to reach and the major advantage is been taken by Google.

**TABLE 1: DESKTOP OS MARKET SHARE AS OF MAY 2013**

Desktop & Laptop Operating Systems	Percentage Market share
Windows 7 ( Microsoft)	44.85%
Windows XP ( Microsoft)	37.74%
OS X ( Microsoft)	7.06%
Windows Vista ( Microsoft)	4.51%
Windows 8 ( Microsoft)	4.27%
Linux	1.26%
Other	2.14%

Source: <https://www.netmarketshare.com>

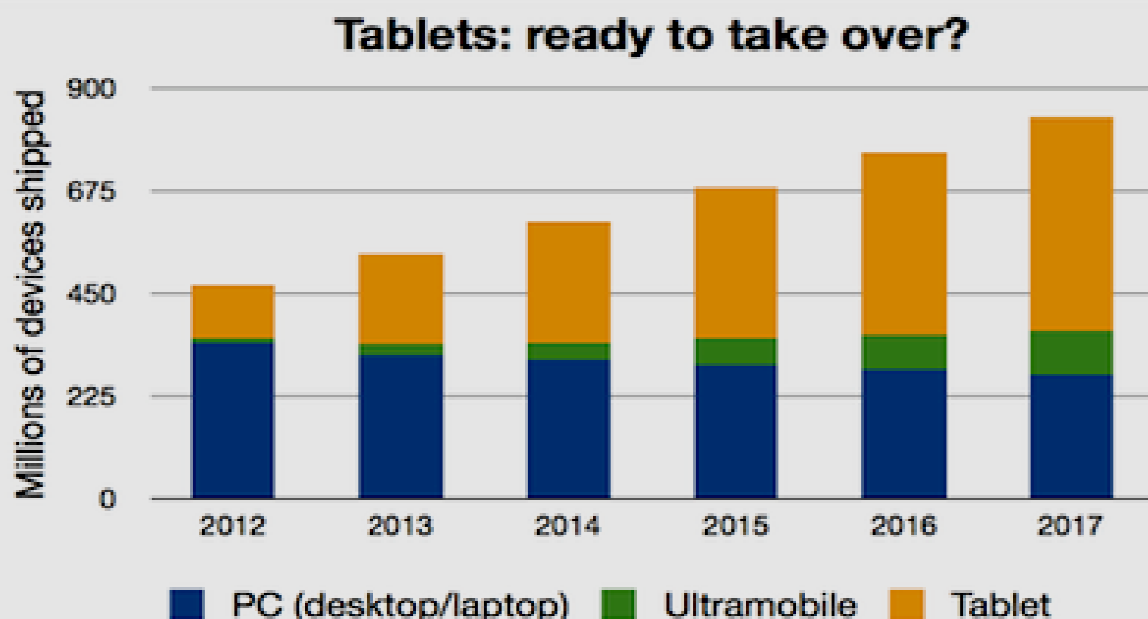
**TABLE 2: TOP SIX SMARTPHONE MOBILE OS, SHIPMENT, AND MARKET SHARE, Q3 2012 (PRELIMINARY) (Units in millions)**

Operating System	3Q12 Shipment Volumes	3Q12 Market share	3Q11 Shipment Volumes	3Q11 Market share	Year-Over-Year Change
Android	136.0	75.0%	71.0	57.5%	91.5%
iOS	26.9	14.9%	17.1	13.8%	57.3%
BlackBerry	7.7	4.3%	11.8	9.5%	-34.7%
Symbian	4.1	2.3%	18.1	14.6%	-77.3%
Windows phone7/ Windows mobile	3.6	2.0%	1.5	1.2%	140.0%
Linux	2.8	1.5%	4.1	3.3%	-31.7%
Others	0.0	0.0%	0.1	0.1%	-100.0%
Totals	181.1	100.0%	123.7	100.0%	46.4%

Source: IDC Worldwide Mobile Phone Tracker, November 1, 2012

Smartphone and tablets are increasingly dominating the world of smart devices. The advent of mobile data smartphone becomes affordable it is rapidly reaching masses. This has widely been discounted by telecom operators but smartphone and tablets offer more flexibility in term of mobility, access to internet and low cost. This upgraded technology from the integration of computer and mobile phone has posed serious threat to laptop and desktop sales. The trend indicating by 2017 there will be decrease rate of sales in laptops and desktop and increase in sales of smartphone and tablets.

TABLE 3



Source: Gartner (2012)

#### EARLY STAGE OF MOBILE OS MARKET

Mobile phone operating system was not viewed as major attribute by consumers for purchase decision in the initial stages, since much preference was emphasized on hardware component and additional features like FM radio, MP3 players, camera etc. Later when mobile phone manufacturers started integrating mobile phone with computers this leads to emerging importance of reliable user-friendly software. Inability to down size and incorporate the computer operating system into mobile phone due to hardware constraints leads to design of new operating system with competent, user friendly mobile OS. This opportunity was mainly sensed by Google and started developing mobile OS.

#### GOOGLE'S ENTRY INTO OPERATING SYSTEM BUSINESS

Google is mainly in search engine business and 99% of their revenue is generated from advertisement. They sell web based advertising, monetizing search traffic (CPC-cost per click, paid listing etc.) with the search engine market share 83% in desktop and PC and 81% in mobiles and tablets. Google anticipated the change in technological environment a trend from PC to smartphone and tablets users, this change should be responded to keep the market share up and search engine available to all devices users which help them to tap maximum number of users. So the company started developing the strategy to make the product available in futuristic devices.

Following with the effort Google started investing from 2001, Google acquired 126 companies from Feb 2001 to May 2013 with its largest acquisition being the purchase of Motorola Mobility, a mobile device manufacturing company, for \$12.5 billion and one of the smart investment was Android a mobile software company for \$5 million making it a wholly owned subsidiary of Google, was founded in Palo Alto, California in October 2003 by Andy Rubin. Key employees of Android Inc., including Rubin, Miner and White, stayed at the company after the acquisition. Reports from the BBC and the Wall Street Journal noted that Google wanted its search and applications on mobile phones and it was working hard to deliver that. Through the effort and acquisitions Android unveiled its first product a mobile device platform built on the Linux kernel version 2.6 first commercially available phone to run Android was the HTC Dream, released on October 22, 2008. From this point Google never looked back, with its huge resources branded the Android quickly worldwide and kept constantly improving and coming up with new version regularly.

#### TECHNOLOGY SHIFT FROM LAPTOP TO SMART PHONES AND TABLETS

Computer Dell released its first quarter report down 79% in earning as consumers turn from personal computers to smartphones to tablets. Laptops and desktops as went stagnant in terms of evolution or even companies has not concentrated much on developing innovative features in teams of hardware components beyond increasing RAM, storage space, processing speed and reducing weight etc. Unlikely in mobile phone technology improvements are rapidly developed with in short span of time. The key shift in technology in mobile phones came when manufacturers started incorporating the features of computers like increased processing speed, improvised software (operation systems), computer based user applications software's (known as smartphone apps) and internet usability enhanced the mobile phones which at present stage looks fare more superior then laptops and desktops and this was contradicted with the sales figures.

The real shift was seen in the end of the 2010 PC has always sold for more than smartphones. In the first quarter of 2010, 85 million PC were sold worldwide compared to 55 million smartphones. The cross over is expected by 2012, instead by the third quarter of 2010, 94 million PC were sold agents 100 million smartphones. The trend of PC sales is stagnant or at best modest growth around 300 million per year.

The traditional PC manufacturing companies like HP, Dell and Lenovo who were also late to react to the change in trend now started considering as major technological shift started developing new products and most of them has introduces there smartphones and tablets in the market.

#### COMPETITORS AND OTHER FIRM'S REACTION TO CHANGE

With no clear view that the introduction of new technology of smartphone and tablets was by one individual firm, it was the collective contribution of technological bits from various firms. The major contributors for smartphone and tablet technology are Apple, Samsung and Google where initially all three firms has different core business and business model now converging towards single industries.

Apple was the second largest IT Company by revenue after Samsung electronics and 3<sup>rd</sup> largest mobile manufacturers after Samsung and Nokia. Product differentiation, product excellence and innovation are the key strategy of apple along with its legendry leader Steve Jobs. The introduction of first iphone on January 2007 a convergence of internet enabled smartphone and ipod along with Apple's Mac OS X (later renamed as ios). Later in January 2010 apple



introduced tablet ipad running with modified ios, this 2 introduction bring the wave of technology changing the world of smartphone and tablets. The customer responses were at record, The Company has set record sales for the iPhone and the iPad.

Now with only one line of products in each category apple fail to address multiple segment of customers, followed by the death of Steve Jobs in October 2011. Post Steve Jobs era was not relay proving good for Apple.

Samsung rise in mobile industry is one of the turning point, they pioneered the industry in touch screen technology now one of the core attribute of the smartphone and bring more innovative features to smartphones. Nokia's dominating presence in the mobile industry was a tough challenge for any competitors in the industry, Samsung has slipped past Nokia selling 90 million handset in the first quarter of 2012 to become the world largest mobile phone company ending Nokia's 14 year regime.

The combination of Android and Samsung's hardware yielded in best mix and been able to win the customers all over the world. TGB (Technology Business Research) indicated Samsung's performance solidifies its competitive position against rival Apple and two company's control 90% of worldwide smartphone market. In this neck to neck war between two major manufacturers Samsung seems to have a major advantage over its rival.

Samsung's combination with Google has benefited both the firms but Google has also launched its mobile phone Nexus one on January 2010 manufactured by HTC, later Google extended length by Nexus S and Galaxy Nexus manufactured by Samsung, latest edition was Nexus 4 manufactured by LG electronics. Now with the acquisition of Motorola Mobility on August 2011 Google can manufacture in its own facilities. Showing once Samsung and Google were in same track to counter Apple in smartphone now slowly moving into opposite direction.

The combination of Nokia and Microsoft seemed much as a partnership of loser's pushing hard to make a strong come back with their Nokia Lumia series (windows phone) but at present status they may not be a major threat for any of the market leaders. Even then Google with Android and Nexus clearly has edge over both Samsung and Apple.

## FUTURE TECHNOLOGY AND MARKET TREND IN SMARTPHONE AND TABLET

With no doubt that consumers all over the world have casted their votes on smartphones and tablets future orientation will be focused on constant improvement on technology. Smart device future also impacted by an in-depth understanding of how core component technology, business model and services will evolve.

Samsung investing heavily on the Active Matrix Organic Light Emitter Diode (AMOLED) technology assuming that consumers would pay a premium for high contrast display coupled with lower devices power consumption. Apples engineers focused on developing technology such as multi-touch capability combined with a capacitive touch screen to create an entirely new user interface model.

The entire base of business domination in the industry stands on the technology and innovation. McKinsey & Company, Inc has identified top mobile device, hardware and software trend that will significantly impact these devices over the next five years.

TABLE 4

Changing Technology Trends In Smartphone's and Tablets	New Developments in Technology (New Trends)
Display	AMOLED- A full efficient, flexible and foldable display technology react to "retina resolution" (i.e. a higher display resolution density that boosts text and graphic clarity )
Processors	ARM processors with low power consumption and more compact in size.
Sensors	Biometric, pressure and environmental sensors
Batteries	Lithium- sulfur and carbon nanotubes will increases 80% more capacity, wireless battery charging and fast battery charging.
Operating system	ios5 and new version of Android
User interface	Gesture and retina tracking, infrared keyboard and context aware user interface

Smartphone's and tablets as primary computing, firms focusing to position smart devices main computing devices in workplace. Smartphone and tablets are only as adjunct for workplace for occasional remote usage, the future trend will be to bring it as primary device at workplace. This requires new wave of mobile applications.

As the trend, opportunities indicate the smart devices market has richness for innovation and change, room for existing firms to make strategic moves with technology change and revolutionize the industry. The firms need to make sure their own strategies and business plans to capture values from the shift are equally creative.

## CONCLUSION

Technology will continue to advance and amaze us. Once computers and mobile phones were superior technologies at different ends which are combined to form a for more superior devices (Smartphone and tablets) which is leading the marketplace. With this technological change we see shift in players who are responsible for technology. Microsoft and Nokia ruled the early stages to till now were replaced by Google, Samsung and Apple.

This clearly indicates the firm with ability to bring new technology as pre the customer preference and adopt new strategy suitable for new technology will be able to survive and flourish in the market place. As the smart device technology and business strategy is changing rapidly, most enterprises want some way of taking advantage of these changes to make their business profitable and compete more effectively.

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