_____

Latest Trend of Selling Smart Phones: A Case Study

Puneet Banga
Ph. D Research Scholar (CSE Dept.)
MMEC, MMU, Mullana
Ambala, India
pbanga@mmumullana.org

Dr. Sanjeev Rana
Professor (CSE Dept.)
MMEC, MMU, Mullana
Ambala, India
dr.sanjeevrana@mmumullana.org

Abstract— Smart phone has become an integral part of human life. Now days' smart phone play a significant role in our day to day life activities like finding optimal route for some location, searching contents to web, forming social e-life to conversation among peers and many more. We expect a smart phone, must be equipped with latest technology with ample storage and computing facilities. With the rapid growth of electronic industry, smart phone gets old one in a short span of time. So, the major challenges are to analyze whether the smart phone is outdated or not i.e. it may be due to some hidden marketing strategy by mobile companies. The purpose of this research paper is to reveals latest case study about promotion of their latest smart phone models in the market to generate higher revenue and to enforce buyer to make decision toward his purchase of latest smart phone.

Keywords- *Smartphone , Trend, Selling, ARM, SoC, Android, iOS, Benchmark score.*

_____*********_____

I. INTRODUCTION

In today's W*orld*, we want something that turns our hectic working style into smooth workflow that works spontaneously and gets synch with our mood even. The solution is Personal Digital Assistant (PDA) like: smart phones of today's that are packed with huge storage capacity, ultra-fast processors along with swift graphics support, large and vivid display for wonderful readability experience with latest sensors for multipurpose usages into a single unit. For such type of digital friend or say coworker that helps us throughout a day, we need to spend handsome amount of money. According to study [1]: The average selling price of smartphones in India touched $157 (9100/- INR approximately) in the second quarter of 2017. This is an increase of 25% compared to the average selling price last year. Smartphone price on an average was up by just 3% in 2016. The sudden change in drift reflects a shift in consumer buying in price sensitive market, indicating that more smartphone users are now willing to spend more on higher-priced models from renowned vendors like: SAMSUNG AND Apple [2] and mid-segment priced phones launched by Chinese companies (Xiaomi, Huawei, Vivo, Oppo etc.). The statistic shows the number of mobile phone users in India from 2013 to 2019 [3].

Figure 1. Number of mobile phone users in India from 2013 to 2019

According to International Data Corporation's (IDC) [4]: Samsung is number one smartphone vendor in India in Q2, 2017 with 24% share followed by Xiaomi with 17% share. The Korean company witnessed a decline of 4% because of growing competition from Chinese vendors who have now started to focus equally on offline segment as well.

II. CHARACTERISTICS OF TODAY'S SMART PHONE

Nowadays we as a consumer looks into following features or might been highlighted by vendors with following traits like: display size, resolution of display, operating system, processor kind (32 bit vs. 64 bit) and its speed (in GHz), graphics card, RAM (in GB), storage capacity both internal and expandable, camera (both for rear and selfie for front), slots availability, network type (4G Volte, 3G etc.), connectivity options (Wi-Fi, Bluetooth, NFC etc.) and sensor support (Fingerprint, Accelerometer, Ambient Light Sensor, Proximity Sensor, E-compass, Gyroscope etc.) Let's have a look on one of the smart phone by Samsung which will illustrate the current perspective and key features of latest gadget:

TABLE I. S8 PLUS (MIDNIGHT BLACK, 128 GB WITH 6 GB RAM) [5]

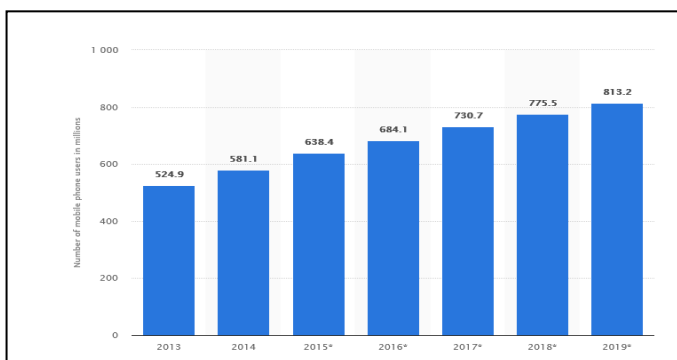| Sr. No.	Feature	Description
1	Model Name	Galaxy S8 Plus
2	SIM type	Dual
3	Hybrid Sim slot	Yes
4	OTG	Yes
5	Quick charging	Yes
6	Display Size	6.2 inch
7	Display Type	Quad HD+, Super AMOLED, Corning Gorilla Glass 5
8	Operating System	Android Nougat 7.0

_____

9	Processor Type	Exynos 8895, Octa Core
10	Clock Speed	1.7 GHz-2.3GHz
11	Internal Storage	128 GB
12	External Storage	256 GB
13	RAM	6 GB
14	Primary Camera	12 MP [Dual Pixel OIS -Optical Image Stabilization]
15	Secondary Camera	8 MP [Virtual shot]
16	Network Type	4G (Volte), 3G, 2G with different bands
17	Connectivity	USB, Bluetooth, Wi-Fi
18	Sensor(s)	Accelerometer, Barometer, Fingerprint, Gyro, Geomagnetic, Hall, HR, Proximity, RGB Light Sensor, Iris and Pressure Sensor
19	Other features	LTE Cat 16 Capable, Water and Dust Resistance: IP68 Compatible, Fast Charging on Wired and Wireless, Wireless Charging Compatible

Out of above mentioned features, we have focused on some of key traits that are most important when you will make a purchase for your latest smart phone.

1. Processor: For rapid computing, we required efficient processors that will solve our assigned task quickly. Now processors are available with more cores, started with Single core, then Dual core, now we have Quad core, Hexa core and even Octa core are touching the sky. Let's talk about two revolutions that have significantly changed the world of computing in mobile market:

1.1 ARM: Advanced RISC Machines, originally devised by Acorn Computers. It was born due to fulfill the need for cheap and more importantly, low-powered chip for portable devices. ARM uses a completely different architecture as compared to Intel and AMD [6]. Since the ARM architecture is licensable, companies can either obtain to design their own, customized CPU or simply opt from one of ARM's ready-to-ship core designs like: ARMv7, ARM9, ARM11, Coretex-A8, Cortex-A9 and the most recent, Cortex-A15. However, top notch SoC manufacturers like: Qualcomm prefer to design their own custom design rather than with stock.

1.2 SoC: Latest invention inspired from its predecessor (ARM) that makes this handset market more and more rapid is due to System on a Chip. It is an integrated circuit (IC) that combines all the primary components into a single chip [6]. Ideally, a SoC [8] consists of a Central Processing Unit (CPU), Graphics Processing Unit (GPU), Modem, Multimedia processor and signal processor(s) all together.

So, let's start with one simple question: *Is an Octa-core smartphone twice as fast as a Quad-core one?* Logically, yes, when it's running an app that takes the full advantage of its abilities when you are doing multitasking. So, we want some application code that will evaluate the performance of desired processor. Nowadays we have benchmark tools [9] that are capable to test various aspect of SoC including I/O for

AnTuTu benchmark score for different SoC predicting the real-time performance like: AnTuTu, Quadrant, Geekbench-3, NenaMark-2, Vellamo mobile benchmark, 3DMark Sling Shot, GFXBench GL, NeoCore and many more available free of cost in the e-market.
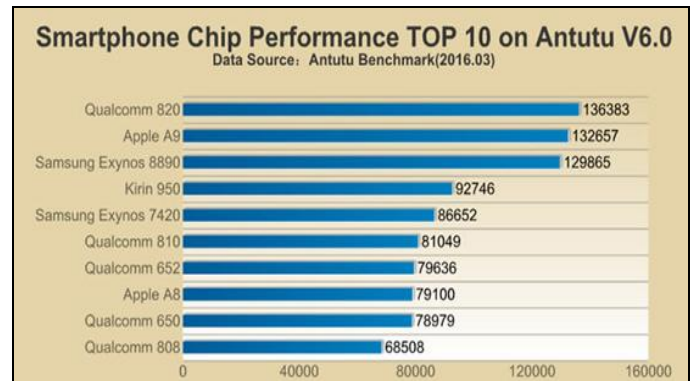

Figure 2.   Top 10 smartphone chip performers [7]

Major SoC players: A battle review
Top SoC manufacturers that are powering the giant smart phone with lots of scope to meet future needs are: Qualcomm-Snapdragon, Samsung-Exynos, HiSilicon (now acquired by Huawei) -Kirin and MediaTek etc.
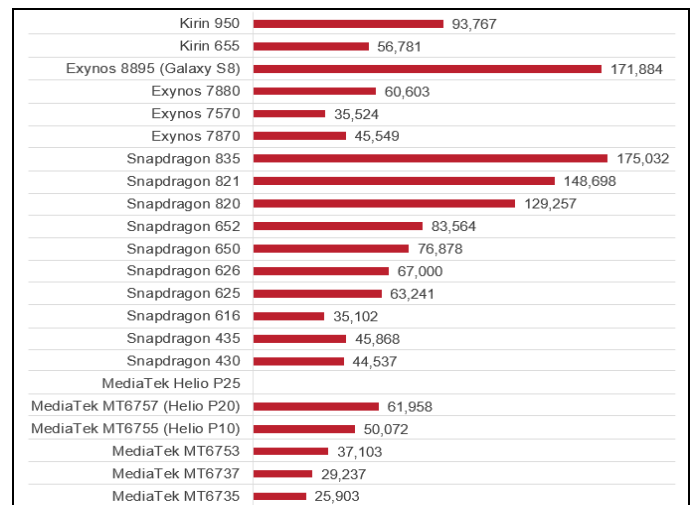

Figure 3.   AnTuTu benchmark score for diffeent SoC manufactures which not considered CPU alone but other vital resources [10]

2. Operating System: OS always play a significant role for any underlying machine.
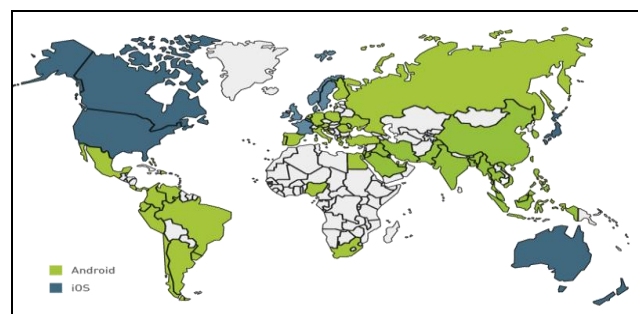

Figure 4. Android and iOS geographical distribution [11]

_____

But when it comes to portable devices with limited battery life, then several design issues will matter. Nowadays there is no tuff competition among mobile OS companies as two prime competitors in the market are: Google Android and Apple iOS. So, if you have a smart phone in your hand then 87% chances are there your phone is equipped with android and chances of 12% [11] that you are enjoying iOS inside it.

III. NOW THE QUESTION ARISES?

I. ***Why small group of smart phones in the world are being able to fetch out latest release of mobile OS especially in the case of Google's android platform? [12]***

There are many reasons to describe this tedious and but obvious question, but among them there are some points like: Synch with Customized UI at the top of android like: Samsung-Touchviz, Huawei –EMUI, HTC-Sense Vivo-Funtouch etc.; Certification issue for connectivity and Carrier support issues and other internal libraries support glitches. According to report [13]: Active devices under Android Nougat are 26.3 %, Marshmallow is still about 28.6%, with Lollipop still trailing close behind at 25.1%. Following the release of Oreo in August (2017), the latest operating system is only on 0.7% of devices. In contrast, Apple's iOS 11, which was released in the middle of September, was installed on 59% of devices till writing of this research paper.

II. ***Is any standard body that will govern and audit the specification of components especially camera and video performance?***

We would like to address one important issue about camera's quality specification by different brands: Why do different smartphones with the same megapixel camera resolutions have different quality of image? Answer is simple: lack of uniformity. So, there must be some standard organization that will audit and govern the real performance so that there should be uniformity in terms of real competition.

IV. MARKETTING STRATEGIES BEING EMPLOYED?

Smartphones makers are unveiling their latest phones so quickly that when you just browse any e-shopping app you will be surprised by number of latest arrival. This is one of the technique by which you either feel outdated or being perceived accordingly. The techniques may be like: addition of internal memory, RAM capacity, fast processor, camera's quality, vivid and large display size, expansion of sensors etc. so quickly. But when you either replace or exchange your current phone with latest purchased model you either feel no difference or the difference is negligible with respect to price bracket in mind. So, what is the reasonable life of a modern smartphone and when should you upgrade? The answer varies depending on who you ask? If you ask Google, powering 87% of smart phones, the answer is 18 to 24 months. [14]

V. CONCLUSION

Smart phone is now doubt one of the essential entity for today's life ranging variety of operations, covering heterogeneous audience throughout the world. But when it comes at the point: When to purchase? Which one is better? Is new one is really a better choice are still thinkable questions to be solved yet. So, there should be a way like our desktops and laptops are maintained with future needs in terms of updating the required component(s). We personally believe there should be some ways to sort out this issue: One thing, there should be a way to replace old SoC or other vital hardware component(s) with recent one as we are updating software modules easily. Second thing, there should be a standard committee that will take care of standard procedures being used and their specification details for healthy competition and to make transparency in the market. Last but the least, the purpose of this research is not to stop buying latest smart phones, but to enlighten you to take efficient decision towards purchase.

ACKNOWLEDGMENT

REFERENCES

[1] www.thehindubusinessline.com/info-tech/mobiles tablets/smartphone-average-selling-price-sees-25-jump-in-q2/article9883980.ece

[2] https://economictimes.indiatimes.com/tech/hardware/average-sale-of-smartphones-going-up-by-3-expected-to-rise-this-year/articleshow/58118160.cms

[3] https://www.statista.com/statistics/274658/forecast-of-mobile-phone-users-in-india/

[4] http://indianexpress.com/article/technology/mobile-tabs/indian-smartphone-market-shows-signs-of-revival-samsung-still-no-1-xiaomi-no-2-4799077/

[5] https://www.flipkart.com/samsung-galaxy-s8-plus-midnight-black-128-gb/p/itmeuggehq2umb7u?pid=MOBEUGGE2DGK6EJH&sattr=color&sattr=storage&sattr=ram&st=ram

[6] http://www.firstpost.com/tech/news-analysis/all-you-need-to-know-about-mobile-phone-chipsets-3598565.html

[7] https://lifehacker.com/these-are-the-top-10-smartphone-processors-as-rated-by-1763258262

[8] https://www.androidpit.com/fastest-smartphone-processors

[9] https://getandroidstuff.com/android-benchmark-app-processor-speed-test/

[10] https://bestgadgetry.com/qualcomm-snapdragon-vs-mediatek-vs-kirin-vs-exynos-benchmark/

[11] https://android.jlelse.eu/apple-vs-android-a-comparative-study-2017-c5799a0a1683

[12] https://www.androidcentral.com/why-you-ll-never-have-latest-version-android

[13] https://www.digitaltrends.com/mobile/android-distribution-news/

[14] https://www.dailyo.in/technology/smartphones-long-lasting-upgrade-nokia-iphone-android-google-nexus/story/1/11957.html

_____