Mobile Application and Its Universal Impact

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Abstract. The current market of mobile application market is expanding with variety and diversity. The rise of Android and iOS based mobile operating system providing similar playing field for all the applications. In this article, some credible evidence from the modern market and the new figures clarified the current situation of mobile applications and their position on the global market. In fact, we expect this paper to assist with issues relating to mobile applications in general and mobile phone in general in the fields of study.

1 Introduction

Mobile application is one of the greatest and vastly used electronic program in this modern era. From dawn to dusk and dusk till dawn, people are spending most of the time using mobile applications in their mobile devices. Nowadays, modern social life relies heavily on singular cellular devices, the usage frequently surpassing that of various forms of computers. Our life is becoming much facilitated because of it. A few years ago, it was harder to communicate with each other from one corner of the world to the other. However, now people can easily initiate communication

among themselves by using mobile applications, where the location and position does not interfere. Using mobile applications, developed and developing countries are upgrading themselves in every aspects of their life and making a modern generation based upon technology. Mobile applications are running on a small and handy devices which are easier to use, globally accessible. These days, people are using mobile applications to communicate with their friends, improving social communication skills, creating social network, devouring in entertainment, and many other purposes in their life. On the other hand, mobile applications now have greater impact in business side. A lot of business companies are earning revenues from this sector. People are using these mobile applications in numerous mobile platforms such as Android OS by Google Inc., iOS (IPhone Operating Systems) by Apple Inc., Tigen developed by Samsung Electronics, BlackBerry OS by Research In Motion, Windows Mobile by Microsoft, Symbian OS by Nokia etc. As well as these, there is also a lot of companies creating less expensive mobile devices and applications for the people near or below poverty line and making mobile applications fairly available to them.

2   Mobile application overview

Mobile applications are some specialized programs which help the users execute some special task through mobile devices. A mobile application is multitasking capable program that can handle multi-threading execution style workload. These applications are referred to as apps in short form. Apps run on handy mobile devices which are relatively tiny, movable, easier to operate, and globally accessible. A user can use a pre-installed or downloaded app at any time.

Mobile applications have a vast user base only for some special features like calling, texting, World Wide Web surfing, chatting, social network communication, game, audio, video etc. Someone with expendable time for entertainment can easily choose apps for the purpose. A phone usually comes with a certain set of pre-installed apps out of the box. Besides, a user can also download platform dependent applications that have been developed by third party app developers as oppose to not native OS developers. Various platforms that are showcasing mobile apps of myriad types are meeting places of a large number of mobile applications developers, publishers and providers. Due to technical compatibility issues, not all applications are capable of running on all platforms. For example, an android application cannot be executed on an Apple device. This increasing level of mobile application market is making a new type of IT infrastructure and contributing a lot to information and communication technology sector.

According to mobile applications area, there are divergent classes of mobile applications. Some of them are:
- Communication
- Business

- Education
- Entertainment
- Productivity
- Health
- Wearable
- Travel
- Medical
- Utilities

3   Past of mobile applications

Mobile apps are, by definition, organically associated with the electronic item of mobile phone. Therefore, the history of apps must take a look back at the very history of mobile phone itself. Motorola's Dr. Martin Cooper and John Mitchell conceptualized and implemented first hand-held mobile device [1] in 1973 weighing almost 4.4 pounds (2 kg)[2]. In 1983, the DynaTAC 8000x became the first mobile phone that went up in market, costing around $3,995 (standing at $9460 with present inflation rate). Fig. 1 displays the first commercially sold phone, which had the dimension $13 \times 1.75 \times 3.5$ in inches and weighed about 2.5 pounds. It was capable to render a little more than half an hour of talk time. Making calls and sending texts were mostly used function for that time. Later in that decade, developers realized that smart-phones is a multi-functional device that can not only communicates but can also help to learn, earn, and have fun. Therefore it should be subject to improvement. On the cusp of twenty-first century, some small mobile applications like arcade like games for mobile, cellular ring tone composer, calculators, calendars etc. had begun to be developed.

Fig.1. First Mobile device[3]

4   Present of mobile applications

During the last decade, the usage of people has been increasing gradually, since mobile companies are making devices in a way that is cheap and user friendly, and also trying to make available mobile devices to all [5]. For the last few years, a majority of mobile phone companies are building smartphones that are capable of running a wide variety of apps. Simultaneously, they are also investing in featured applications to attract their customers. A good share of people, especially the younger generations all over the world cannot imagine to pass their time without having mobile devices. Hence, the users of mobile application are growing rapidly day by day [6].

There is an abundance of categories for using mobile applications. Here some major sectors are going to be explicated. We all know about that time when

Chart 1.1: Global changes in major ICTs, 2000-2015*
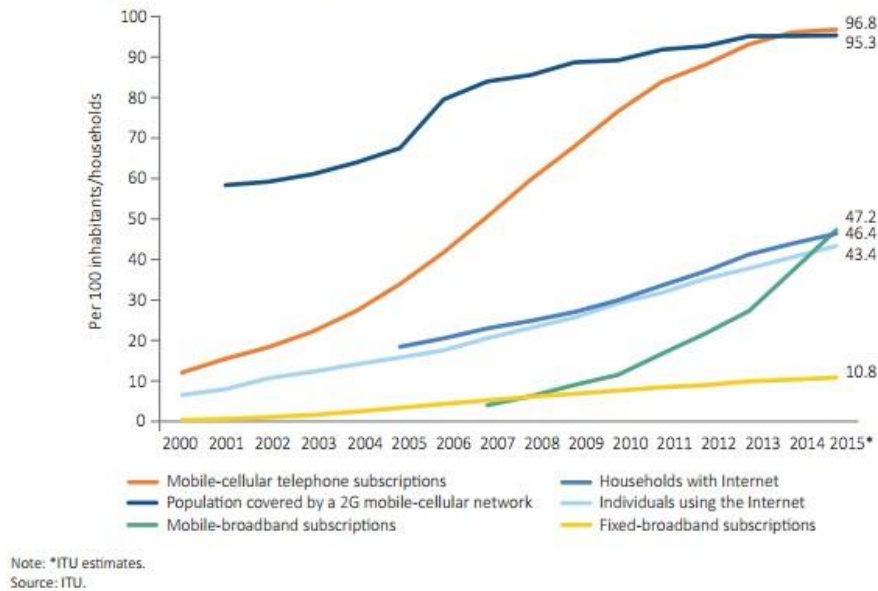

Note: *ITU estimates.
Source: ITU.

Fig.2. Broadband subscriptions of mobile phones from 2000 to 2015 [4]

Mobile devices and applications were not available to us. We faced how much difficult and tough was that time to communicate with each other. But these days' people are forgetting about that time because of highly efficient mobile applications. At this moment, the most used apps are Facebook, Skype, Imo, Viber, Google due and Whatsapp etc. which are available in a greater number of smartphones [7]. People are yearning and capable of sharing their situations, emotions, and moments of their lives with their friends and families from any kind of internet accessible place within a second. People can do chatting, video calling, sharing and voice calling through these applications in very low or free of cost.

Then we can talk about Global positioning system (GPS). GPS plays one of the most vital roles in current IT Infrastructures. Instant location tracking, navigation of roads or traffic assisting, tracking of vehicles, local business infrastructure searching, driving and walking directions etc. are the prominent uses of application using GPS system. The Google Maps mobile application, currently updated and maintained by Google Inc. offers us satellite imagery of any area globally, street mapping in viewable position, 360 panoramic views of important street points (Street View), real-time traffic conditions (Google Traffic), and route planning via various mediums.

E-commerce is another great part in internet based business world and these platforms are also easily accessible through mobile devices with internet access.

Potential buyers can view, select, and also order merchandise or services through mobile apps. People can use mobile devices as wallet in restaurants or markets for alternative payment method [8].

Artificial intelligence (AI) is exceedingly becoming one of the buzzing topic in app startups as well as other businesses too. Some great technology-based companies like Google-Deepmind, Apple, OpenAI etc. are showing interest in AI based research and product investments. EBay, Amazon, and other giants in the retail industry have already proved the success of AI based mobile apps for various tasks. With advancements in technology and consumer demands, AI mobile app development is next big thing for enterprises. Integrating AI based algorithms into their products appeal to their users strategically, resulting in eventual revenue generation. Amazons prime delivery service is a standing example of the previously explained situation [9]. Moreover, many applications and devices with redesigned intelligent user experience and integrated AI algorithms to adjust their strategy according to observed user behaviors perform better in business. Furthermore, this process able companies to utilize the data collected by apps via online traffic, POS machines, and more, often leading to more integrated and easier application.

Sometime we can use our mobile devices and its apps as remote controlling appliance. We can control any air-condition, television, fridge and other electronic machines through remote controlling system. Sometime it is possible to control any home or office devices from a remote place through internet connected mobile apps.

On the other hand a lot of people are using mobile apps for entertainment purposes. They are watching videos and listening to audios in YouTube [10] directly using mobile app. Besides this, there is a great number of gamer who play game in mobile devices. According to statista, statistical evidence showing data containing on the number of apps available for download in leading app stores until March 2017 is shown in Fig 3. On that month, Android users had the privilege of picking and choosing among 2.8 million apps in that store. Not too far behind, Apples App Store came in second place with 2.2 million apps available in their store.

5   Hardware evaluation based on mobile app

When the first mobile device the DynaTAC 8000x had arrived, it was valued at $3,995. It was lavishly expensive because of its hardware resource. However, the prices have generally tended to go down since then due to advancements in hardware technology and increase in demand. Generally, a mobile device is manufactured with circuit board, liquid crystal display (LCD) or flat panel display with light-emitting diodes (LED), and batteries. There was a period when the raw materials essential to build these components were expensive and onerous to collect. Nonetheless, these days these raw materials have become available due to extensive mining and better refinement technologies. Manufacturer companies are trying their best to manufacture good mobile devices with great app
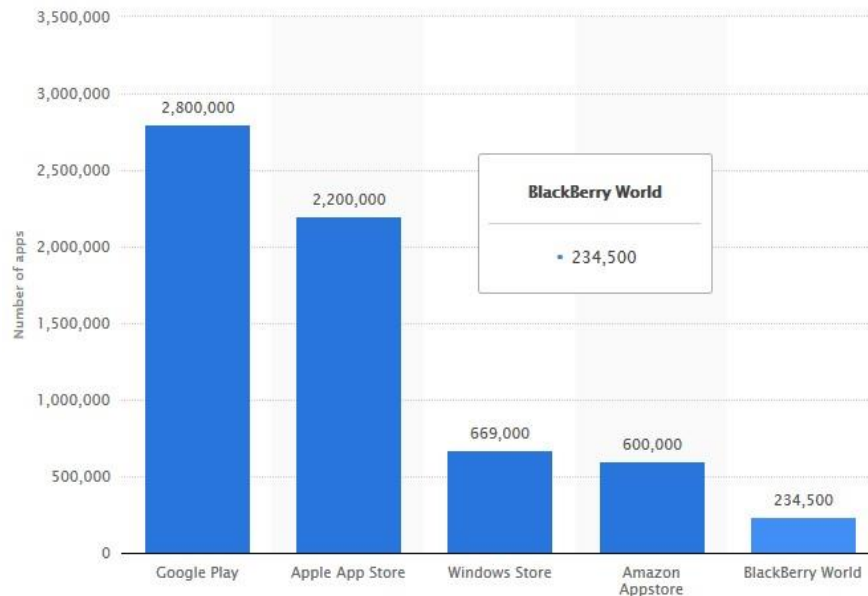
Fig.3. Amount of apps accessible in leading app stores as of March 2017 [11].

compatibility. Hardware are being built with some extra capability to run mobile applications fast and smoothly. Because of this hardware evaluation, mobile devices are becoming cheap day by day [12].

6   Popular mobile companies

Mobile devices pose extensive impact in society alongside mobile applications. There is an array of mobile companies in this world. They are doing competition among themselves to release better and user friendly mobile devices in the market. These companies also have some software dissimilarities. They are creating their own user interfaces (UI) with some special customized applications to attract their customers. These UIs are different at different companies' devices to disperse different vibes. There are some popular mobile companies like Samsung, Nokia, Apple, LG, Zte etc. who dominate the global market share of mobile phones where the applications are hosted. Table 1 depicts the market share scenario of 2013.

7   Business of mobile broadband internet

Mobile broadband is the marketing term used for wire-free internet access through any medium or range of devices, including smartphones, tablets, and modems (portable or USB),

Table 1. Market Domination Scenario [13]

Company	Sold Phones (in Millions)	Market Share (Percentage)
Samsung	444 M	24.6%
Nokia	250.79 M	13.9%
Apple	150.78 M	8.3%
LG	69.02 M	3.8%
ZTE	59.89 M	3.9%

or other mobile gadgets. Table 2 shows the dispersion of wireless cellular technology through the decades, which is important because the first wireless internet access only became available in 1991 as part of the second generation (2G). This is why first generation of wireless mobile technology is peculiarly absent from this table. Higher speeds for internet connections became available via later generations in this millennial. In 2011, 2G network covered areas consisting of 90 percent of the world's population, while 45 percent among them enjoyed both 2G and 3G coverage [14]. In last few year, people from all over the world are using mobile broadband at a much higher rate which shown in Fig. 2. According to the survey of International Telecommunication Union we can see that the mobile broadband has a greatest numbers of subscriptions from Fig. 2.

Table 2. Introduction Period for Internet through Wireless Cellular Technology [14]

Telecommunications Technology	Acronym	Introduction Period (Internet)
Second generation	2G	1991
Third Generation	3G	2001
Fourth Generation	4G	2006

8   Mobile application development business

On account of having portability and customizable UI, people are using smartphones a lot. The count of active smartphone users is projected to be up at 2.1

billion in 2016 and rise up to almost 2.5 billion in 2019, along with increased smartphone penetration rates. More than 36% percent of the world's total population is forecast to own a smartphone by 2018, increasing from about 10% percent in 2011 [16]. Fig. 5 represents the total predicted amount of smart-phone users from 2014 to 2020.

All of the devices have a varied range of platforms or operating systems such as iOS, Android, Windows, and Blackberry etc. There are different types of apps for these platforms. Often apps being built with cross platform through different coding conventions and even different teams. A number of brand offers user
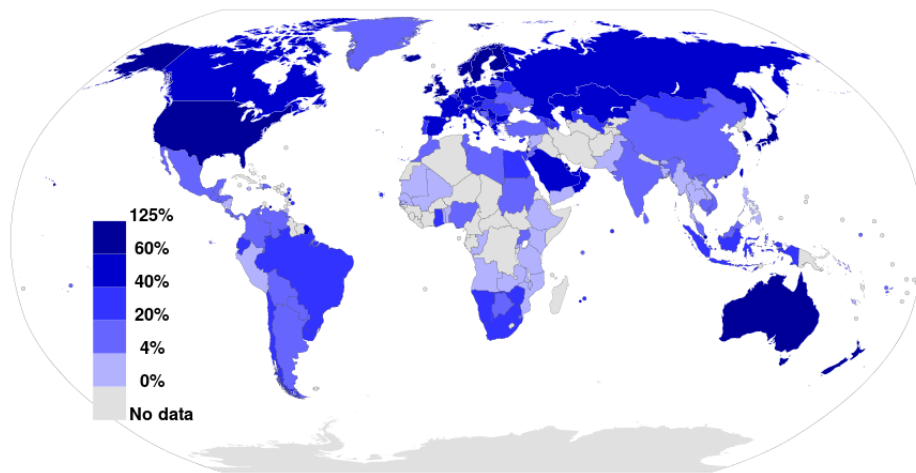
Fig.4. Internet subscriptions of mobile broadband in 2012 as a percentage of a country's population [15].

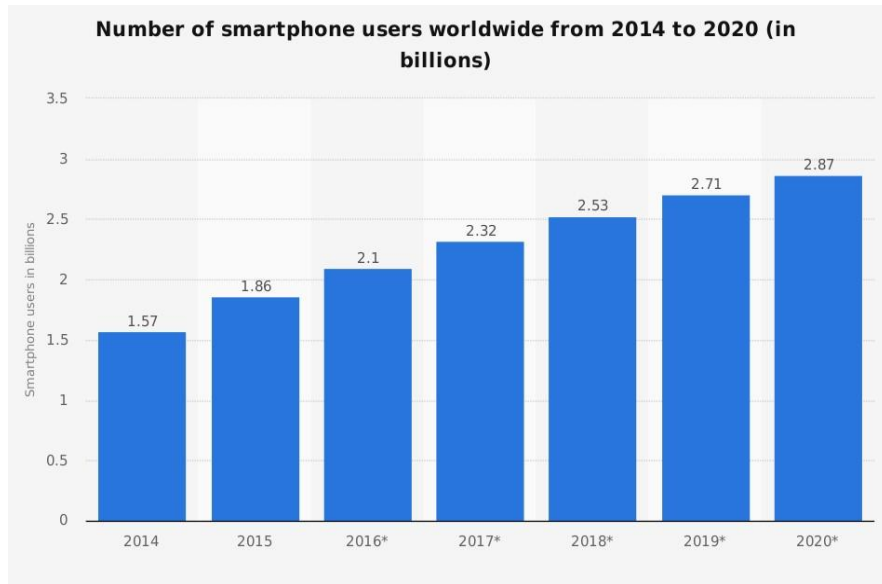**Number of smartphone users worldwide from 2014 to 2020 (in billions)**

Fig.5. Total amount of smartphone users worldwide. from 2014 to 2020 (in billions)[17].

friendly applications with their devices in a pre-installed fashion. This is not rarely completely satisfying for their users demand. Because of this issue, people download and install apps from platform-based app stores which their phone is able to support. Besides these manufacturing companies, there are lots of developer companies that tries to develop some specialized apps for these users. If more users use their phone brands to run apps, their apps will be promoted easily and they will acquire revenues.

There are chiefly two categories of Business store models. The first is on deck, and the second is off deck. They are also referred to as native and third party, respectively. According to a statistics of Statista the total number of mobile app downloads in 2017 is 197 billion including paid, free, as well as ad-supported apps. Note that this is a forecast from their part [18]. In 2015, global mobile app revenues amounted to 69.7 billion U.S. dollars. In 2020, mobile apps are featured to generate 188.9 billion U.S. dollars in revenues through app stores and in app advertising. Netmarble games, Supercell and Bandai, Namco entertainment were the top grossing mobile gaming app publishers in the Google Play Store worldwide in February with over 40 million U.S. dollars in app revenues each. From Fig. 6 the increasing level of app revenues globally is very high in 2020.
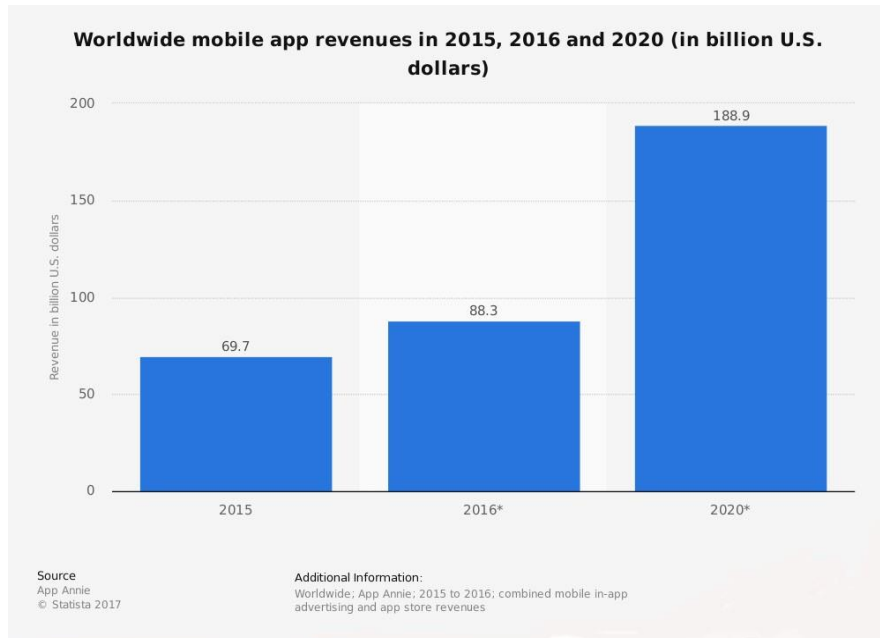
Fig.6. Mobile app revenues worldwide in 2015, 2016 and 2020 (in billion U.S. dollars)[19].

People from all over the world are showing their interest in this sector. The latest estimates say there are 12 million mobile app developers worldwide. Representing more than half of the total global developer community, and almost half focus their attention on Google Android. The total number of developers is expected to reach 14 million by 2020 [20].

9   Business promotion and advertising using mobile applications

People can promote their businesses and advertise their businesses through mobile applications. This concept of promotion and advertising is not so old. If an app has something that its user needed then they will use the app and automatically promote the app. For business promotion or advertising business all that is needed for an app is its popularity and uses frequency[21]. Mobile application publisher, distributor and service provider can earn revenues over this process.

However, mobile ads are also a part of free mobile applications. But a paid applications user can use any type of applications without facing any advertisement also they can get extra features which a free user fails to get.

10   Market of gaming applications

Electronic Game is another great part of entertainment. People from all over the world are playing electronic game continuously. After releasing smart mobile devices, mobile electronic games known as video games are becoming extremely popular day by day. A mobile game is an electronic game played on a smartphone/tablet, featured phone, PDA, smartwatch, portable media player or electronic calculator. A Tetris variant on the Hagenuk MT-2000 device was the pristine known game on a mobile phone in 1994[22]. Snake was the very popular game in 1997 launched by Nokia [23]. In most mobile devices this game was installed by the company that manufactured by Nokia, has since turned into most played video games. Moreover snake was found on approximately 350 million devices worldwide [24]. This game was the first two-player game for mobile phones which used the infrared port for the Nokia 6110 device. Now this market is becoming boundless rapidly. People from developed countries are earning huge revenues from this far-reaching market.

According to the survey of Newzoo from Fig. 8 the global mobile app market generated $444.8 billion in gross revenues in 2016, and 82% of that came from mobile games. Top 20 countries according to game revenue which shown in Fig.9

The company said in a report that global app revenue will grow to $80.6 billion by 2020, and game revenue will grow from $36.5 billion in 2016 to $58.1 billion in 2020 which is shown in Fig.6

11   Total gamers

People are becoming too much addict with mobile games. The amount of present gamers are huge. There are lots of reason behind mobile game addiction. Because of having easily accessibility mobile games are so popular. We all know about
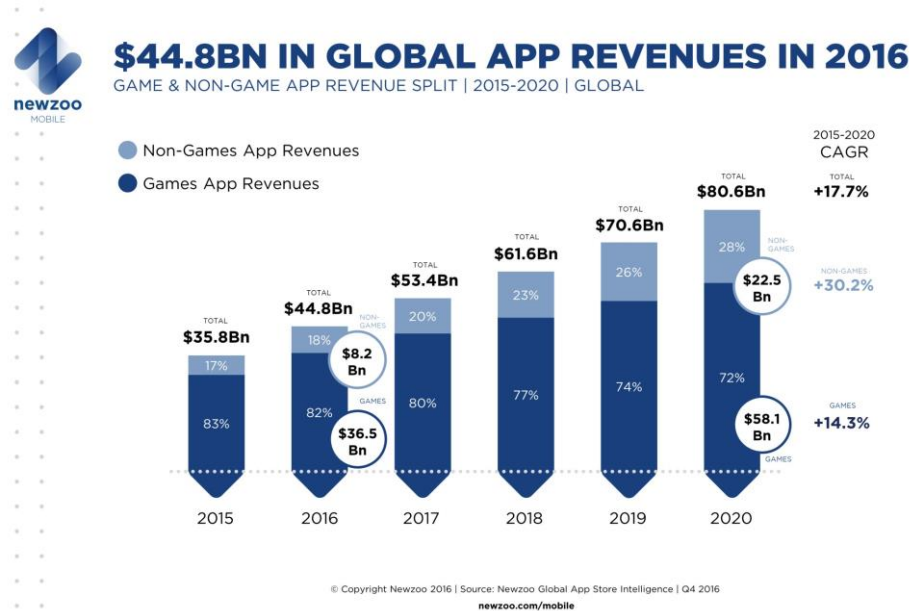
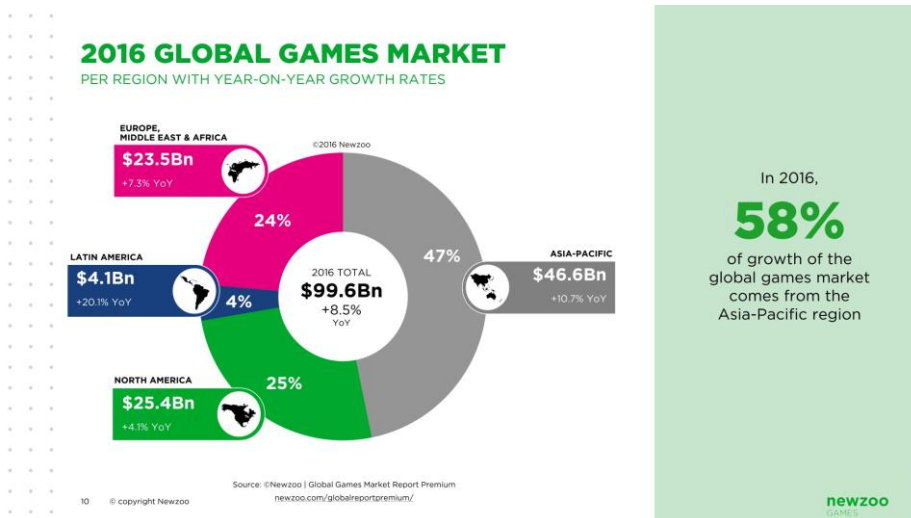**Fig.7. App revenues worldwide in 2016 [25].**

Fig.8. Universal game market in 2016 [26].

the availability of mobile devices in our world. Therefore, any person who have a mobile device and internet accessible data connection can easily download games

Fig.9. Top 20 countries [26].

From app store or play store which are pretty painless. Furthermore, most of the mobile games are free or very cheap. Literally, most people will complain that it is too expensive if a game costs $8 or more. Mobile games are fun. Developers are trying to make a game too much enjoyable. Though people are not going to want to play an unexciting game. However mobile games are doing so well because of people's addiction and their magnificent feedback.

Total amount of mobile gamers globally as of June 2014 has been clarified by the statistic in Fig.10, broken down by region. Approximately there were 740 million mobile gamers in Asia Pacific In 2014. This amount is growing rapidly in every second.

12 Involvement of artificial intelligence in mobile applications

We all know that, Artificial intelligence (AI) is a great sector of computer science that indicates the creation of intelligent machines that work and reacts like humans. Artificial intelligence is a growing technology in the digital world. It is a smart and effective way to save time and be productive all the way. So why not it should be used in mobile applications. Companies answered this question by creating some great mobile applications with AI involvement.

There are some useful mobile applications which are given below [28]:
1. Cortana: It helps to manage tasks that would otherwise need hands to do.
2. Hound: It helps to search and display anything from the internet by speaking naturally to the app.
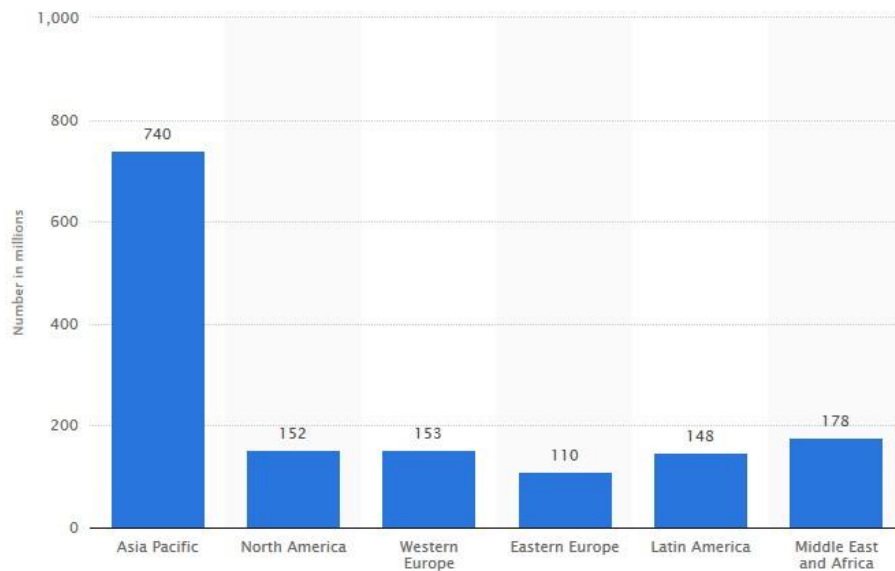

Fig.10. Amount of mobile gamers in June 2014 [27].

3. Recent News: This is a news aggregation app powered by Artificial intelligence algorithms that study users reading habits and keep them updated on latest articles, news and relevant reading stuff according to their interest and past behavior.
4. Elsa: Elsa is an English language speech assistant app which offering professional coaching on pronunciation with series of exercises and teaching material.
5. Robin: This app works like a personal assistant. It allows its users to get localinformation, write text through voice, jokes and GPS navigation without moving their eyes off the road while walking or moving.

13   Participation of mobile applications in health sector

People are using mobile applications in every aspect of their life. These days, some healthcare based mobile applications have remarkable involvement in health sector.

The interaction of doctor and patient plays the most important role in healthcare sector. It was more difficult for a doctor to interact with a patient about their problems. The improvement of quality and access to care are the main goal of healthcare based mobile applications. Providers are developing many types of mobile health care applications with the help of advance technology and patients are using these applications according to their problems. Here are some best useful health related mobile applications [30]:
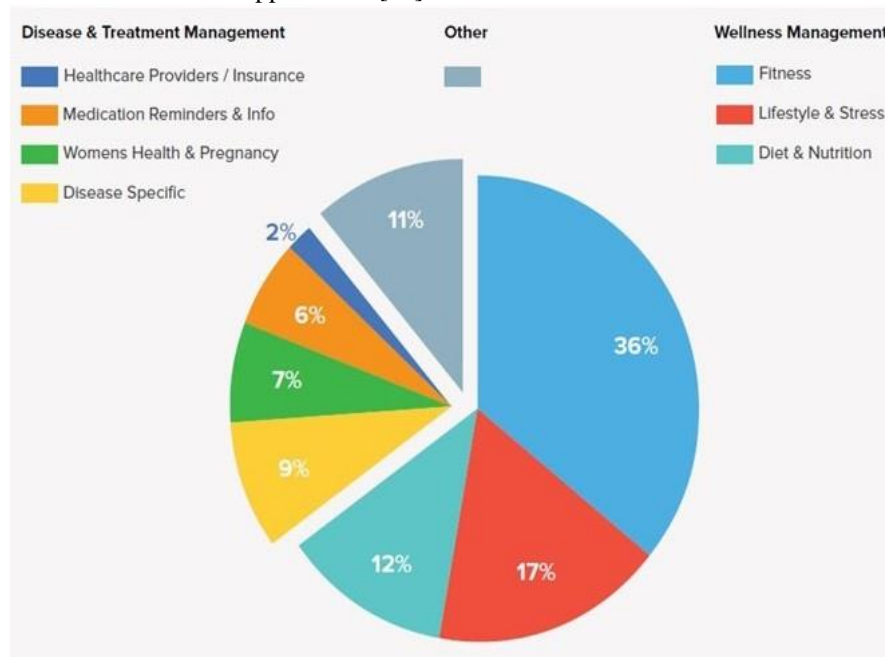

Fig.11. Downloaded health care apps in 2015 [29].

1. Micromedex: Simple pharmaceutical reference app features with proper drug dosage and medicine recommendations.
2. UpToDate: A great way to keep track of medical advancements and news through this app.
3. Johns Hopkins ABX Guide: This is a comprehensive reference app which allows to search for information on medications and treatments regarding various illnesses.
4. Red Cross First Aid: This app provides simple step-by-step instructions to guide through everyday first aid scenarios, whether talking asthma attacks or broken bones.
5. MyChart: This app allows to access medical records on mobile devices at any time.

14   Effects in social perspectives

Lives of people from all over the world are changing by mobile applications. Mobile applications have broad affect not only on individuals or business, but also in society. Nowadays, a society can make progress by using mobile applications. Here are some great special issues:

Quick communication:

There was a time, when communication was uncertain and critical. People had to toil to communicate with each other in long distance situations. Now, some mobile applications like Facebook, WhatsApp, Viber, Line, Snapchat, Google Hangouts etc. are incredibly changing the situation. Through these applications, people can easily interact with each other over the internet without incurring much charge from their cellular carriers. It is becoming easier for staying in touch with one another where geographical distance is not a matter of concern. Overall, mobile applications have positive effects on society and expedites quick communications.

Save time and increase productivity:

No one needs to be spending much energy over loud voice from office to office, or sending irrelevant emails. These are simply waste of time. Through some useful mobile applications, employees can do an abundant number of tasks related to office works at beneficial time. Therefore, there is no need to stay in a room or an office to complete a task. People can get more time to do greater number of work by using mobile applications and also this process is time-saving. Productivity of manpower of a country or a society can be increased gradually through mobile applications [31].

Improve IT infrastructure in developing country:

It was very hard to gather some authentic information's for improving knowledge. Sometimes people failed to collect some important information about their interests. These days in developing and developed countries people are improving their knowledge by accessing the internet from everywhere. Thus, IT infrastructure of a developing or developed country is improving expeditiously.

Increase job opportunity:

Mobile application and development business has vast effect on society. This field is creating more job vacancy in national and international environment. As reported by Indeed approximate salary from 55,564 users, employees, and past and present job broadcast in the past 12 months was $84,716 average per year in USA [32]. Therefore, this field is also a well-paying field for an unemployed but skilled person.

Considerable cost saving:

National or international phone call and text can be possible without paying any cost. Because of this monthly expenditure and cellular data charges can be reduced.

Entertainment:

People can entertain them whenever they want through mobile applications. Besides this there are also some cons which can harm a society or a country. Those common and highly effective issues are given below:

1. High configurable devices and well developed applications are good for adult and positive people. But if a man wants to do some crime or destructive work then he/she can be capable to do so by using these technologies.
2. Students or teenagers are taking this field seriously. They are using mobile applications for gathering and improving their knowledge but alongside some are wasting their valuable and important time by using Facebook, YouTube, Instagram, Google, Skype and other applications more and more [33].
3. Mobile devices have some physically harmful issues. Regularly use of mobile is very harmful for health [34].

15   Conclusion

Overall, popularity and usage of mobile applications are on an upward curve. Because of increased portability, easy accessibility, and amazing UIs people are using mobile devices and mobile applications a great deal more instead of desktop for tasks of easy as well as medium complexity. Manufacturers and developer companies are trying to boost the capability, capacity, and functional ability of mobile applications. Currently, mobile application has its impact in a wide range of aspects of our life. Globally the significance of mobile applications is becoming extensive as well. In this paper, the current situation of mobile applications and its status in global market has been explained with some authentic data from modern market and latest statistics. Moreover, we expect that this paper will help in the fields of study on mobile applications in general and mobile phone related aspects in general.

Acknowledgements

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