An Empirical Study on Adoption of Mobile Apps among Youth in India

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Abstract: Today, more than a billion people are using smart phones and mobile applications. It is impacting every aspect of our daily lives. A research show that about 80% of the total time spends on Smartphone is spent on mobile apps. Globally consumers and businesses alike are using mobile apps for everyday activities, e.g. mobile banking, e-ticketing, weather report, m Commerce and the list goes on. As the modern version of the saying, 'where there is a will, there is a way' goes as 'Where there is a need, there is an App' and it's true! There are literally millions of mobile apps now. There are apps for social networks, banking, travel, health, fitness, news, calendars, games, you name it, there is sure to be an app there for it. Following Moore's Law until 2014, an exponential rise was observed in the clock speeds of mobile processors and transfer capabilities of SoCs (System-on-Chip), leading to a boom in the mobile as well as semi-conductor industry. With the release of the first Nexus, Google quickly ascertained its flagship ideology and retained its position at the top of the food chain all over the world, but Apple led with its trademark products like the iPhone and iPad, already having established the Mac and Macbook as extremely reliable and performance-oriented gadgets in developed countries. This research paper is an attempt to study the consumer adoption behavior of the mobile apps , and relate it to the concept of product life cycle. The mobile app industry is very the dynamic, and apps are fighting for customer attention and retention.

Keywords: Mobile Apps, Consumer Adoption Model, Product Life Cycle, Operating System, Business Environment, Innovation

I. Introduction

The changes in demographic conditions have triggered the mobile usage in the last decade, which has grown in enormity. Data from Nielsen on mobile media time shows the consumer preference for mobile apps account for 91% of media time in mobile as might be expected from the use of the most popular social network, email and news apps.

The necessity of mobile applications, notwithstanding respective their background operating systems, was realized when Google purchased Android Inc. in 2005 seeing its immense potential in the then-stagnant mobile industry. Following 2009, when the first iPhone was released, mobile applications became the quick go-to and paved the way for mobile computing, gaming, entertainment and security, quickly replacing outdated gadgets like the PDA. Tech Crunch explains that experts predict that, by 2018, 49 billion apps will have been downloaded and "app-to-person messaging should overtake text messaging.

In today's world, there is an app for everything. Apps have become an integral part of our daily lives, with people spending an average of 30 hours per month in them, according to Nielsen. Developed specifically for devices like tablets and smart phones, mobile applications deliver impressive experiences for personal users and businesses. By 2019, 1.6 billion global consumers will have the power of a PC via their mobile device; this shift will drive continued demand for apps that provide education and entertainment, extend business processes, enhance communication, and improve productivity.

Mobile applications and services are overtaking the World

Wide Web for the key activities that we do on the Internet. Mobile is an increasingly important part of any company's marketing strategy, and developers think mobile first when they design new Internet applications. In 2018 the app economy, the revenue driven through mobile apps and related activities, is expected to reach \$150 billion. Employment in India's app economy is expected to double by end of 2018.

According to Gartner, in 2017, mobile apps were downloaded more than 268 billion times, generating revenue of more than \$77 billion and making apps one of the most popular computing tools for users across the globe. Mobile apps have become the official channel to drive content and services to consumers. From entertainment content to productivity services, from quantified-self to home automation, there is an app for practically anything a connected consumer may want to achieve. Consumers are spending more time on their apps than ever before. Over the past half-decade, the proliferation of mobile devices has transformed us into an app-driven society, presenting marketers with new opportunities to connect with consumers by creating more interesting and sophisticated apps to command their attention.

Mobile apps have also changed the way businesses connect with consumers and have the potential to boost a company's bottom line. According to a study by Iowa State University, there is a direct link between app use and purchase activity – the more engaging the app, the more customers will spend. With the rising smart phones and internet penetration, the mobile application industry will grow tremendously to match demand and keep up with ever-evolving technologies. A Smartphone is the one that has a vast range of applications (built-in) and supports plenty more from the external apps markets. These apps allow the user to do almost everything that previously required a Desktop PC or a laptop. So apps are the very essence of a Smartphone. These applications are what that changes a mobile phone into a Smartphone.

II. Mobile Applications -Concept

These are compact software programs that perform a predefined function and are designed to work on handheld devices such as Smartphone, tablets and feature phones. There are plenty of considerations when it comes to designing and developing mobile applications. Mobile applications can be broadly classified into two different types based on the mobile development technology employed to create them. These are **native mobile applications** and **web mobile applications**. Both types can help achieve similar results or perform similar functions but are inherently different in development. Also a

combination category of these apps is available called as **hybrid apps**.

Mobile Gaming and Entertainment - Applications like Candy Crush and Angry Birds became household names, and raked in advertisement dollars in the millions. To this day, the second most grossing application remains Candy Crush, having earned most of its money through in-app purchases. The mobile entertainment industry grew steadily as the concept of Internet of Things was initialized,

connecting gadgets to other gadgets, phones to smarter TVs, computers to console and what not. Movies, songs and readable content can now be accessed from anywhere, by anyone; easily with the power of the Internet accessorized with powerful mobile chipsets.

India overtook US in Paid App downloads

170 mins is the average time Indians spend on apps, 6th heighest in the world. 40+ apps are the average apps Indian install and use every month, is the heighest in the world.

32% of the apps are uninstalled in 30 days.

Only 5% people remain active on the app after 30 days.

Figure 1: AppsFlyer's Mobile Attribution and Marketing Analytics (MAMA) 2018 report

Some apps are free, while others must be bought. In terms of monetization, the model of paid apps is very straightforwardpeople purchase the app from the app store, 70% of the app's cost goes to the developer and the remaining 30% goes to the distribution partner. The revenue is proportional to the downloads. To spread their apps as largely as possible, many developers make them free for users to download. Free apps require different monetization strategies. To make money developers rely on in-app advertising. Other strategies adopted include making available trial/lite/free versions, sponsorship, freemium model, etc. Modern mobile apps can be classified into three types:

Web Apps: Web apps or HTML5 apps use standard web technologies to build mobile applications that work on multiple devices. The benefits of web apps include fast development cycles and instant updates. These are basically the 'mobile-friendly version' of websites. Since web apps run on browsers and are cross- platform, they have the broadest audience of the three types of applications.

Native Apps: Native apps live on the device and are accessed through icons on the device home screen. Native apps are installed through an application store (such as Google Play or Apple's App Store). Native apps are built using an integrated development environment with the development tools and

languages that the respective platform supports and therefore run only on their targeted platforms. Native apps are distributed through application stores. They are developed specifically for one platform, and can take full advantage of all the device features — they can use the camera, the GPS, the accelerometer, the compass, the list of contacts, and so on. They can also incorporate gestures (either standard operatingsystem gestures or new, app-defined gestures). And native apps can use the device's notification system and can work offline. They are developed specifically for one platform (platformspecific), and can take full advantage of all the device features providing the best usability, the best features, and a rich mobile experience.

Hybrid Apps: Hybrid apps are part native apps, part web apps. (Because of that, many people incorrectly call them "web apps"). Like native apps, they live in an app store and can take advantage of the many device features available. Like web apps, they rely on HTML being rendered in a browser, with the caveat that the browser is embedded within the app. Often, companies build hybrid apps as wrappers for an existing web page; in that way, they hope to get a presence in the app store, without spending significant effort for developing a different app. Hybrid apps are also popular because they allow cross-platform development and thus significantly reduce development costs



Figure 2: How mobile apps generate revenue

III. Objectives of the study

The main objective is to study the state of mobile phone industry, issues, challenges and opportunities. Also, to understand its contribution in facilitating digitalization of daytoday lives of common man in India. The major objectives are as follows:

- To understand the mobile user's perception of the various mobile apps.
- To understand the mobile user's usage pattern of the mobile apps
- To understand some of the prevalent apps and derive the reasons for the same
- To understand some hygiene factors and delight points for the application users
- To derive an understanding of the best practices for an ideal mobile application

Conceptual Framework of Product Life cycle (PLC) and Consumer Adoption Model:



Figure 3: Life Cycle of Mobile apps

Philip Kotler considers five steps in consumer adoption process i.e. awareness, interest, evaluation, trial, and adoption. But, William Stanton considers six steps defined as awareness stage, interest and information stage, evaluation stage, trial stage, adoption stage, and post-adoption stage.

1. Awareness Stage: Individual consumer becomes aware of the innovation. The initial users of a new product or technology called the innovators tend to be more educated, prosperous, and risk-oriented than other members of the market. They are enthusiasts who love technology, and often adopt something simply because it is new. They get idea about a new product from various means of advertising like newspapers, magazines, Internet, television, outdoor media, etc.

2. Interest and Information Stage: In this stage, the consumer becomes interested in innovation and tries to collect more information. The early adopter market tends to be younger and more educated than the mainstream market. They are leaders who apply emerging technologies to the opportunities that are important to them. They collect information about qualities, features, functions, risk, producers, brand, colour, shape, price, incentives, availability, services, and other relevant aspects, from advertising media, salesmen, dealers, current users, or directly from company.

3. Evaluation Stage: The first mass market acceptance group early majority are mainstream users to adopt a new product or technology and tend to be more conservative than early adopters, but are open to new ideas. The accumulated information is used to evaluate the innovation. These consumers consider all the significant aspects like qualities, features, performance, price, after-sales services, etc to judge the worth of innovation.

4. Trial Stage: Consumer is ready to try or test the new product. The late majority segment of the market tends to be older, less educated, fairly conservative and less socially active. Late adopters dislike constant innovation, but will begin to use new technologies after widespread acceptance.

5. Adoption Stage: If trial produces satisfactory results, finally the consumer decides to adopt/buy the innovation. The final adopters called the laggards tend to be the oldest, most conservative, and least educated segment of the market. They don't like technology and prefer the old fashioned way of doing things.

6. Post Adoption Behaviour Stage: This is the last stage of consumer adoption. If a consumer satisfies with a new product and related services, he continues buying it frequently, and vice-versa. He becomes a regular user of innovation and also talks favourable to others. This is a crucial step for a marketer.



Figure 4: Consumer Adoption of Technology

IV. Key Factor in Growth of Mobile Apps Analyzing the users' needs and creating a useful idea out of it is still essential, for creation of long lasting mobile apps. Some of the key factors are as follows:

Connectivity: Apps are always online as the device is constantly logged in to the mobile network. This allows user specific information or notifications being pushed to the App as they are available. With the growing number of Apps on each Smartphone, this push-functionality becomes critical to keep an App in the users mind.

Convenience: An emotional design and a simple singlehand handling, guarantees a high acceptance of an App. A good App can do its job in different contexts and fast varying situations (changing environmental light and noise, unsteady movement of the device, etc.), and also have good content. So the information architecture and the overall usability must be planned with care to create a fitting and joyful interaction flow.

Localization: Localization and the possibility to offer location-based information is a key feature that makes mobility vivid and practical. Localization must not always be thought of as the big thing, but can be useful by just creating a good experience for the user.

Reachability: Reachability covers a more social attribute, as the core of mobile devices is to be used anywhere at any



Security: Security has several facets. The data transferred over the network must be encrypted through the carrier network. As some Apps sync data with online, web-based applications, the storage of this data on the server must also be secured. Another aspect concerns the data on the device itself.

Personalization: Creating personalized content based on individual usage or context is another characteristic. It builds on all previous characteristics as it is a kind of melting down of all of them.

The SWOT analysis revealed that the common reasons for growth of apps is the ease of development of an app, low cost of entry and abundance of skilled workforce. Whereas the biggest challenge is disruptive technological advancements, which inherently threatens the life of an app. The organizations should keep pace with the changes in the taste and preference of the customers. Figure 5, below presents the data on the number of apps available for download in leading app stores as of July 2017. As on that month, Android users were able to choose between 1.6 million apps. Apple's App Store remained the second-largest app store with 1.5 million available apps.



Figure 5: Number of Apps available for downloading at various stores

A study identified the apps that were actually used by the 969.49 million strong global Smartphone populations. According to Global Web Index's the top ten apps actively used by Smartphone users, based on the percentage of global Smartphone users who have taken advantage of the services offered are presented in figure 6 below.



Figure 6: Percentage of Smartphone users who have used the most popular apps (2017) Source: Global web index

V. Research Methodology:

In order to measure Indian respondents' attitudes and their intention to use Mobile apps, an online survey was done and for that purpose a questionnaire was designed and with a sample of 415 respondents mostly graduate and postgraduate students through simple random sampling. The questionnaire was divided into two sections; in the first section was regarding demographic details while second section looked for responses related to attitude, subjective norms, perceived behavior control, intention and usage behaviour. The paper also used the studies available on the topic. Since it is comparatively new area, industrial reports were more prominently available, which are quoted in the introduction and other sections of the paper. Online Survey Form was generated on google forms

(Link to Survey form: http://goo.gl/forms/nl3gy2dMGZ).

VI. Findings and Analysis

PART-1 (Demographics and Details)

Most of the respondents agreed that they are spending 2 hours + online through mobile apps on a daily basis. In some cases, the time spent is exceeding comfortable or even acceptable limits of 5 hours extending beyond 10.



S. No.	Gender	Freque	Perce
		ncy	ntage
1	Female	194	46.70%
2	Male	221	53.30%

Figure 7: Gender Distribution of Respondents Since the questionnaire was circulated through email, the final usable sample size is 415, and the gender distribution is approximately equal. But the



Figure 8: Profession Distribution of Respondents

Majority of the respondents i.e. more than 80% are students, the biggest consumers of mobile apps. 5% of the respondents are academicians, and there are 8% in service. The students are of both undergraduate and post graduate courses in engineering and management. Majority of the respondents have no work experience i.e. 76.6 % of the sample. Approximately 15% of the respondents have less than ten years of experience. 5% of the respondents have less than twenty years of experience. Very few respondents had more than twenty years of experience. As shown in figure 10, Android is the most popular category in mobile phones. Apple i.e. iOS and Windows are closely competing at second and third place in terms of popularity.



Figure 9: Years of Experience of Respondents



Figure 10: Types of Mobile phones used

More than 50% of the respondents spend 2-4 hours on their smart phone online. Approximately 10% people are really addicted to use of mobile phone and remain online for more than 10 hours per day. As is shown in Figure 11, 96 people remain online between 5 to 9 hours, and around 15% people are online for less than hour per day. It is important to note that the duration of staying online, is directly related to the use of apps, as majority of the apps are internet based.



Figure 11: Time spend Online



Figure 12: Primary use of Mobile phones

As is seen above, use of internet is biggest interest of the Smartphone users, followed by SMS and calling. Almost 65% of the users have between 5 to 20 apps in their smart phones. The category-wise analysis is further presented in section -2 of the analysis.



Figure 13: Total number of Apps in Mobile phones

While certain promotional offers extended through mobile apps are fast becoming reasons for first time usage of certain apps, the major reasons for download of any application remains its functionality, entertainment and the value that it provides to the user. Multimedia applications primarily used by people for entertainment and leisure have been present on user devices since very long. It is through these applications that people pass their time when required. It has also contributed to increased device convergence requirement amongst the users. Users tend to delete the application once they have derived the use out of it. Once the application has fulfilled its usage it seems like a burden on the system resources and it becomes the reason for uninstallation. In-app advertisements and application not meeting the users' expectations are also major put offs for the users. Multimedia applications are often used by people while travelling to their place of work. These apps keep them entertained during the time when they are not productive. People also use these apps while exercising or going through their routine tasks and hence their usage is frequent through the day.



Figure 14: Reasons for downloading Apps

Personal requirements and entertainment are the biggest reasons for downloading any app. The app being free, cheap or available for trial, and also the promotional offers associated with apps attract around 25% of the users. Redundancy or obsolescent of apps is the biggest cause deletion of apps from the mobile phones. The close second reason is the memory or space crunch in the smart phones. 40% of the respondents delete the apps, because of the unmet expectations. The most common model of making money through apps i.e. in app advertisements is also one big reason for deleting the apps. Figure 15, gives the pictorial presentation of the various causes of deletion of apps.



Figure15: Reasons for deleting any Apps

Hence we can conclude from the above discussions. Mobile applications and their usage has increased with the times and is increasing further still. People tend to use applications for multiple uses. Mobile apps have in turn increased the proliferation of mobile devices as many people have replaced desktops with mobile devices. Mobile apps have ensured that mobile device convergence is an ever increasing phenomenon with more and more devices being added to the basic mobile phone. GPRS connectivity has further eased the usage of apps. As on date, the social and communication apps are more in frequent usage as compared to system tools or shopping apps. Multimedia applications are often used by people while travelling to their place of work. These apps keep them entertained during the time when they are not productive. People also use these apps while exercising or going through their routine tasks and hence their usage is frequent through the day. System Tools applications are used as and when their usage arises. Many applications like anti-virus and system background tools keep running in the background and provide performance boosts to the device.

PART-1 (Categories of Mobile Apps in Phone)

The various types of apps in the mobile phones of the respondents, and the other related questions yielded the following results. There are five categories of Apps, their analysis is given below.

(a) **SOCIAL APPS:** Number, duration and Frequency of Social Apps



Figure16.1: Number of Social Apps

More than 50% of the respondents have only upto two social apps in their smartphones. People focus on only one social app, with around 40% respondents using only one social apps. But social app is being used for more than an years, which shows the long life of the apps. The favorite social app is adopted by middle majority and stays for a long duration. Also the frequency of use





(b) COMMUNICATION APPS: Number, duration and





Figure 17.1: Number of Communication Apps



Figure 17.2: Duration of use of Communication Apps



Figure 17.3: Frequency of use of Communication Apps

The second popular category is communication apps, where more than 57% of the respondents have two apps. As expected, 87% of the people use the communication apps every day, with around 41.1% respondents using only one app. Communication apps are also being used for more than an year by 75.7% respondents. The favorite communication app is adopted by more than 70% of the people and stays for a long duration. Also the frequency of use is very high, more than 60% people claiming to use it every day, and more than 80% respondents claiming to use it frequently. 96% of the respondents use their communication apps everyday or at least frequently.

The third category of the apps is the shopping apps, which reflects the growth of e-tailer industry. People in India, have developed a flair for online app based shopping. Approximately 50% of the respondents have 2 to 4 shopping apps. Surprisingly 30% of the respondents, are still not using any shopping app, whereas a small proportion i.e. approximately 5% have five or more more than five shopping apps in their smartphone. As is presented in the graphs below, 26% of the respondents use these apps frequently.

(c) SHOPPING APPS: Number, duration and Frequency of



Figure18.1: Number of Shopping Apps





Figure 18.3: Frequency of use of Shopping Apps

The duration of shopping apps is almost evenly distributed, with 24.6% of the respondents retaining the apps for more than an year. Approximately 50% of the respondents had been using the app for shopping for less than year or six months. Around 43% of the respondents claim to use the apps often.

The fourth category of apps are Media, Audio and Video apps like the youtube, music apps etc. This category primarily caters the need for entertainment. Here too, a single app is high on popularity with 30% of the users claiming only one app in their phones. Next 20% claim to have two apps, and another 20% claim to have 3 apps in this category. Only 12% people said they don't have any app in the Media, Audio and Video apps category, and 8% claim to have 5 or more apps. Around 50% people have been using their apps for more than an year, whereas 30% respondents have been using these apps between six months to an year. 65% of the respondents use it every day or frequently. Around 30% people use it often, and less than 10% people claim to never use these apps inspite of having these apps in their smart phones. This is the most diverse category facing tough competition because of the internet tv apps, online internet based entertainment channels and increasing popularity among youth.

(d) MEDIA, AUDIO AND VIDEO APPS: Number, life span and Frequency of Media, Audio and Video apps



Figure19.1: Number of Media, Audio and Video apps







Figure 19.3: Frequency of use of Media, Audio and Video apps





Figure 20.1: Number of Tools Apps



Figure 20.2: Duration of use of Tools Apps



Figure 20.3: Frequency of use of Tools Apps

The final category is the tools apps defined as the utility apps normally provided by the mobile phone companies like camera extensions screenshots, editing etc, wi-fi maps, security apps, dropbox etc. These are core to making to phone a smartphone. The tools are often confused with mobile's inherent features, and hence the respondents were asking for examples of tools apps. Around 30% of the respondents claim to have only one tools app, 20% claim to have two such apps. Around 40% people claim to have 3 to 5 such apps. Approximately 50% people have been using these apps for more than an year, whereas more than 30% people said they have been using it for more than six months. 30% people claim to use it frequently, and around the same number claim to use it daily. Only 10% people claim to never use such app.

VII. Conclusion

Mobile is moving out of the pocket and becoming wearable. With the growth of wearable tech, the need for intelligent aggregation of content will fuel app innovation. The study showed that only few apps remain with the users for more than an year, depending on its various factors. Volume of content produced is going to lead the way further in the media, video category. The payment apps are on a sudden surge and are categorized in shopping apps category. The future is expected to be dynamic, one possible future is that apps as we know them will eventually cease to exist at all – being replaced by brand names and services. For now the major players need to learn a few lessons on remaining in the competition by understanding the customer needs, and developing flexible apps to fulfill these. Also, keep the app light on resources, and most important, advertisement free to certain extent. The companies need to update and renew the apps and not let these become stale and boring. So, the future of apps is action-packed high paced drama with very short life spans, which only few would be able to break.

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