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An Analysis Of The Mobile App Development Industry

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ABSTRACT:
Background/Purpose: We are living in an era where many disruptive technologies have emerged that have changed the entire perception of the business world. One of them is the emergence of mobile application development, which has co mpletely changed the way people use software. While in the past software development usually meant single or web ap plications, now there is a huge scope for mobile application development. Standalone technologies require users to have at least one personal computer to use their applications. However, since the only platform on which the application can be used is the mobile phone, the target audience for the development of this application does a lot. Mobile app develop ment has now become a norm for services to reach their destinations faster because almost everyone has access to mobil e devices. The app development industry has grown at a rapid pace since its inception. This article covers the mobile ap p industry and its management in India in detail.
Objectives: Analyze and understand the mobile app industry globally and in India, understand the trends, usage, revenue, cost and performance of app development in India Answer and perform SWOC analysis of the mobile app industry.

Keywords: Mobile App Development, Android, iOS, Industry Analysis, App Development Industry, App Development Companies.

1. INTRODUCTION:

In the technology industry, software of all kinds has changed the way we look at everything since the beginning of time. We have seen that almost every process that we used to do manually is now done and handled by the system. Software development is a job that belongs to this main class and is a general term used for the development and use of software on websites and individual applications. The minimum hardware required to create these applications is usually a comp uter with sufficient instructions. In the software age, people who can afford and have a computer only use or use it. Unti l recently, people could only access the Internet through Internet cafes. Now even though many have access to laptops and PC's, the count remained significantly low compared to the population. After mobile phones were introduced, which were typically a hand-held computer, the number of people who started buying mobile phones is significantly higher and the number of people who can get an idea of applications started getting multiplied. Today we can say that irrespective of which age group they belong to, people are learning to use an application in the form of a Mobile App.

2. OBJECTIVES:

- To understand the App Development Industry in general.
- To analyse the App Development Industry in India.
- To understand the Usage of Mobile Apps and Revenue generated.
- To understand the cost and scope of App Development in India Compared to others.
- To study the various types of apps in demand and the least preferred apps.
- To perform a SWOC analysis for the App Development Industry.

3. METHODOLOGY:

The information presented and analyzed in this paper are mostly based on Secondary Data obtained from different online sources such as Websites, Journals, Internet Blogs and Articles, Discussions, Books etc.

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4. MOBILE APP DEVELOPMENT OVERVIEW:

Mobile Operating System Market Share Worldwide - March 2023 [1]

With this sort of market people generally look for development of Mobile Apps in Android and iOS, which makes up 99.24 % of the global market currently. Even though Android takes up 96.07 % in India, iOS takes the lead in the US by having 59.97 % [2]. So, the App Development industry majorly focuses on these two Operating Systems as their target. Even though traditional software development is still viable, App Development supersedes them by providing features that a typical desktop or web application may fail to provide. For example, the availability of GPS, Compass, Accelerometer, Sensors, Bluetooth etc. makes the Mobile Phone a much powerful deployment device than a PC. While developing a Mobile App, just like how typical software would be developed, we need to choose a programming language and/or an appropriate framework [3]. Even though we might see Android and iOS development individually, it is essential to see the various types of Mobile App Development available [4]. There are Three Major Types of App Development, they are:

4.1 Native App Development

Native App Development is where a developer creates an app by targeting a particular platform like Android or iOS. It supports all the features that the OS provides and also allows us to utilize the maximum potential of a mobile device [5]. It provides far superior performance than any other types of app development [6]. In order to develop an Android app, developers use Android Studio as the official IDE and Java or Kotlin as the languages through which they create apps. Whereas, iOS developers use XCode and Objective-C or Swift as their languages to develop apps [7]. The Native App development has its own advantages and disadvantages. Let us see them in brief:

Advantages:

- Provides Faster and Efficient Performance since it targets only one OS
- They are more efficient in utilizing the resources that the mobile device has to offer.
- It can take advantage of all the hardware features of a phone such as Bluetooth, NFC, Sensors, Camera etc.
- Provides a Secure, Robust and interactive platform specific user interface.

Disadvantages:

- Since it targets only one platform, the same app needed in another needs to be created from the scratch.
- Native App Development demands the knowledge of Mark-up and Programming Languages for more complex-natured apps.
- The cost of development will go higher since two different sets of codes need to be created to guarantee the app to be available in both platforms [8]

4.2Hybrid App Development

Hybrid apps are half native apps and half web-apps. They can be distributed through an app store and take advantage of some of the native features too [10]. Since they are web apps too, they depend on HTML that gets presented in a browser. Even though they look and feel like a native app, they would still be a simple web app running on a browser and hence the name hybrid app. It helps the developers to reach a larger target audience and monitor how many people downloaded their apps, etc. without bothering about developing two different apps [11]. There is a variety of ways in which we can develop a hybrid app, some of which are React Native, Flutter, Cordova, Ionic, Xamarin, etc.

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Advantages*:*

- Much Faster to Develop and more economical compared to native app development.
- Need to maintain only one code base that will update simultaneously into any platform that is targeted.
- Can be made available even offline.

Disadvantages:

- Cannot be used to develop performance-centric apps like games that need to utilize the 3D features
- Performance is much lesser than native apps since they are limited by Web View.

5. APP DEVELOPMENT INDUSTRY IN INDIA:

The progressive Policy Institute of the United States in a report released in 2019 said that India, as one of the premier technology-centric countries in the world, would surpass the US in the largest developer population hub by the year 2024 [13]. According to that report, India is one of the leading countries in mobile app downloads with more than 500 million users of smartphones. This is sufficient to comprehend the state of India in the realm of apps and app development. India has progressed by leaps and bounds in the areas of App Development, and one cannot deny that. In the past few years, apps developed by Indian App Developers are being hosted in the Google Play Store and Apple App Store [14]. Let us see what are the trends and factors that are the main reason for India to have the largest developer population in the world:

6. MOBILE APP DEVELOPMENT LIFE CYCLE:

Setting the objectives of creating an app is a crucial part of the development where the customer aims on putting objectives that the app must be able to satisfy. This phase also makes sure that the complete technical and non-technical requirements of that app are noted down clearly [5]. This phase makes the developer understand the problem statement clearly and have overall understanding of the requirements of the customer [19]. For example, we must be able to answer questions like the following so to speak:

- Who are the target audiences / end users of this app?
- What is the purpose of developing this app?
- What will be benefit for the developer/company upon building this app?
- What are the technologies and tools that we might need to do this app?

Who are the competitors in the market and what will be the Unique Selling Point (USP) of this app?These are just a few of the questions we need to be able to answer at the end of the First Stage. It is also essential to look for a possibility where this app can be updated and be able to deliver more service as the company or area grows. Most of the time it is the vision for the future that makes an app successful because it needs to stand the test of time itself in a world where today's latest technology can be a legacy technology tomorrow.

6.1 App Design and Prototyping

Once the objectives of the app are clearly stated, it becomes clear what the app will be delivering. In the next step of development, we should be able to design a prototype [17] and form a storyboard. In this phase we need to focus on the functionality that is expected from the app and also the User Interface. The UI part is where we design what the users will see and interact with and give functionality. It is how the user will be using the app. In order to develop a working prototype of the user interface, the common thing to do is wireframing. Wireframing is a way in which we can design a skeleton of our app. Developers use it to understand the functionality of the app better and designers use it to understand the process of UI design [20]. Wireframing can be broken down into three different portions—they are:

I. Information Design:

In this part of wireframing, the focus is on where to present, place and prioritize relevant information in such a way that it helps the user in understanding [20]. It is basically part of UI Design where the information is displayed in such a way that it makes way for clear communication.

II. Navigation Design:

In this phase, wireframing creates a navigation system that gives a set of user screens which normally decides which page to be shown next based on the context and operations done in one screen [20]. There must be a clear relation between each screen and its links so that the user understands how to navigate through the app for various features.

III. Interface Design:

This phase of wireframing includes designing an interface where a user selects or types data via UI elements such as Text Boxes, Check Boxes, Radio Buttons, etc [20]. It makes sure that the app provides maximum usability and performs as efficiently as possible. After the wireframing is done, it needs to go through peer-review and undergo all the changes and suggestions given by the team members or customers. Once this is approved, the next phase can begin. It is easier to change a wireframe rather than changing a complete app in development.

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IV. Choosing a Backend:
Every app will need to store data, but where it is stored depends on the type of data, cost and effectiveness of the storage environment. Normally, users can store data in the memory of the phone itself either in a key-value pair of data stored typically in an XML format or even in a Relational Database like SQLite. But in case the data needs to persist across users and devices, then using a Web Server would be the optimal choice [21]. That choice has multiple variants based on the requirement such as using a custom server, using a cloud server or using an MBaaS (Mobile Backend as a Service)

V. Custom Server:
We can host the data in a relational database or a NoSQL DB in the company's own server, that makes sure that the data stays within the organization but available anywhere via an API call. Scaling and optimizing might be a challenge in this way [22].

VI. Cloud Server:
Cloud Servers come in various sizes and shapes for users to choose from like Amazon Web Services, Google App Engine etc. Data is stored in these cloud servers and are available from anywhere via a service call and is highly scalable and optimized [22].

VII. MBaaS:
It is one of the most recent and popular options that is available as the fastest growing way of delivering data in cloud services. Choosing a particular type of MBaaS, finally is the choice and preference of the developer and what he or she wants to achieve through the app. It is especially helpful to scale our backend in case we target both iOS and Android Apps. For ex.: Kumulos, Progress Kinvey and Kii [22].

VIII. Development of the App:
Once the first two stages are done successfully, there will be a clear picture of what is needed and how it must be done. The next stage would be to start building the app with the learnings that were done in the initial planning, designing and lessons learnt. The developer/company can then choose what kind of a development environment that they would like to develop in [23]. There are different choices based on the target of the app. For Ex. If the app targets only Android users, then development of the Android app using Android Studio with Java or Kotlin will be done. If they are only iOS users, then development of that iOS app will be done using XCode with Swift or Objective C. If it is Cross-Platform, then there are other options like Hybrid Apps with No-Code or Low-Code Development [24].

IX. Testing and Quality Assurance:
Once the app with all of its functionalities is completed, it is essential that we test the app continuously in order to find any and all bugs that the app might have. The app should be rigorously tested with a lot of real-world scenarios to figure out any technical faults that the app has. It is always recommended that the team that does testing is not the same team that built the app since there is a high chance of overlooking from their end. There might be more issues and insights that the development team might not be able to find to be obvious to them [26]. Only when the team is confident that the app satisfies all the requirements stated and is able to handle any scenario given, then the app moves to the next phase.

6.2 Publishing:
Releasing the app depends on the platforms where we need the users to officially get a copy of the app. It might be the Google Play Store or the Apple App Store, they would have their own process of testing the app. Once that is done successfully, the app is officially released and people can start downloading the app into their mobile devices [27]. Prior to this stage, the team will have decided how much and how to charge the user like Single Purchase, Freemium, Subscription, etc. Based on the host, a publishing cost will be charged and/or a transaction fee for each download.

6.3 Maintenance:
The last stage is the constant maintenance of that app after the initial release that actually makes this a Life Cycle. There might be some scenarios or issues that was overlooked in the testing phase and now being pointed out by users and also to make sure that the app works smoothly over the period of hardware and software changes. Failing this stage makes the app irrelevant after a while, and it is vital that as long as the app is needed, developers should monitor the apps vigour and serviceability.

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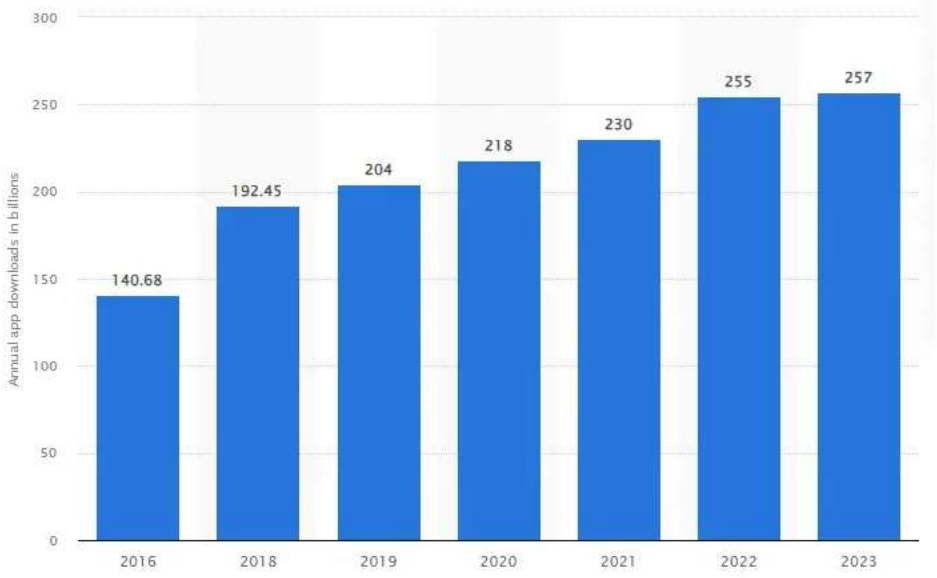
7. USAGE OF MOBILE APPS:

The number of mobile apps that are currently in the market are growing by the day, and people who download apps on various devices are also growing exponentially [28]. That is because currently an average adult is so much glued to the mobile, he/she owns, that is quite evident nowadays while we see others using mobile phones constantly. The mobile App Industry will keep growing till we have people who consume it, which will only keep increasing for the foreseeable future [29]. Below is the graph that shows Mobile App Downloads globally from 2016 to 2023. This graph shows us that the number in billions just keeps increasing year by year [30].



Number of App Downloads Globally from 2016 to 2023

8. COST OF APP DEVELOPMENT:

Calculating the cost of App Development is one of the most important parts of a project proposal. It varies based on a lot of factors which we will discuss now. However, there is a clear difference in the cost when an individual or a freelancer does the app compared to asking an App Development Company to do the same [38]. Both have their own advantages and disadvantages, but we choose based on the context of the app and the customer.

It is not possible to calculate an exact amount as the cost of app development; rather, only an estimate can be drawn based on the requirements given. It is not possible to determine the rate by just taking one factor into consideration and should look for various factors that influence that amount. We will see a few factors that need to be considered before heading for a cost determination [39]. These characteristics determine the worth of the App [25]:

- Functionality/Purpose of the App
- Native or Cross Platform App Development
- Third Party Integrations
- Complexity of the Visual Interface and Code
- Consumption of Hardware Features such as Camera, Bluetooth, NFC, etc.
- Maintenance Plan for the App

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The business of Apps website states that a Simple App can be charged anywhere from $40,000 to $60,000, a Medium Complexity App can be charged anywhere between $61,000 to $120,000 and a Complex App Development can be in the range of $120,000+ in the US. It also states that it would cost

8.1 Cost of App Development in India

Most of the countries outsource their software development tasks to India since the country has enough resources in the field of software engineering and costs less compared to the counterparts. It will cost less than $25,000 in India for a Typical App Development, whereas the same would cost more than $80,000 in the United States. India has been the most inexpensive destination for any Mobile App development. The following are the reasons why India stands as a pioneer in App Development Globally [36]:

- Developing High Quality Mobile Apps for Nominal and Low Cost
- The time taken for the App Development is quite brief.
- Pool of Well-Experienced Developers
- Updated with all the recent technology and Tools Needed for App Development
- Complete Support for Cross Platform Capabilities
- Maintenance offered is longer and professional

These are just some of the reasons why India is a Mobile App Development Hub for the world. India is constantly growing in the field of app development since many of the universities have kept App Development as a subject or an elective in their curriculum. The majority of the developers in India are Young People and are constantly upgrading their skillset.

9. CONCLUSION:

The Mobile App Development Industry is a Young Player in the market and has already crossed the revenue that other IT or IT Enabled Industry has procured. This Industry has evolved and grown drastically in a short period of time and has got people who would have never thought of using software in their entire life and are now experts in using a Smart Phone and all the essential Apps that the phone has to offer. It is safe to say that a Mobile Phone is now not only used for its actual purpose of calling and sending SMS but a lot more than that [43]. The number of new users joining Apple or Google to activate a new device is constantly growing every day. India has taken advantage of this industry to put itself as a country of fast-growing App Users and App Developers in the world. Apart from that, India has also contributed to be the third largest country from which the revenue from apps have been phenomenal. This industry has made way for India to be a world leader in not just consuming apps, but also developing them. India has also become a preferred country to invest in app development globally. We have discussed in detail how this industry is and will be. Since we cannot see a decline in the usage of mobile phones in our day-to-day life, we can also be sure that the App Development Industry is going to thrive in the upcoming days. If it focuses on utilizing the recent trends in IT appropriately and delivering Apps that are not going to be just a remake of existing apps, then the Mobile App Development Industry will keep growing in the upcoming years.

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