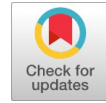


# Analysis of Cross Platform Application Development Over Multiple Devices using Flutter & Dart



Shivam Jadaun, Rajeev Kumar Singh, Rohit Kumar, Krishna Kant Agarwal

**Abstract:** With the looming of new mobile applications, the organizations, and industries of all types whether it is IT Consultancy, Human Resources, Logistics and Supply Chain Management etc. or to be more specific any industry or organization that is thriving for their development in their sectors are relying on application development now a days. Through which app development industry is quickly advancing day by day. Embracing of various Operating Systems like Android, iOS, Symbian OS etc. in mobile development industry only Android OS is most loved and used by the people now a days and this Android OS is gaining popularity in upcoming generations also. Secondly talking about iOS by Apple it is also gaining popularity but not up to that extent as Android OS has gained and stabilizes itself in the industry. Although the iOS is very famous for its security reasons. Symbian OS now is a desisted OS or in simple terms extinct from the industry was owned by NOKIA used up C++ as the programming language to provide a simple yet implicit User Interface to their user for a seamless experience in mobile applications. This thesis/Research paper aims to present the benefits of using Cross Platform Application Development using Flutter as while Java or Kotlin is basically used in Application Development but the only drawback of it was that for individual Operating System we have to code individually and for another Operating System we have to code individually. So, to overcome this obstacle we are using Dart Programming Language using Flutter as a Platform upon the Android Studio or the Visual Studio Code for Developing our App.

**Keyword:** Android OS, Android Studio, Database, Dart Programming Language.

## I. INTRODUCTION

Mobile Application Development or simply App Development is a proceeding of making or developing mobile phones or basically smartphones applications for

enacting specific operation at usually meets the user's request. Now these mobile apps are generally developed for both Android OS and iOS as they both are admired and rooted themselves in the industry. Talking about previous era of mobile apps C or C++ are generally considered as the Programming Languages for the development of Mobile Applications now as the industry is advancing day by day new Programming Languages are being developed and released into the industry market. Java, C#, Swift, Dart etc. are one of the examples of Application Development that are flourishing now a days in the industry and on the other hands these also are becoming popular among the developers of Mobile Apps. Moreover, Mobile Application Development is not just only developing mobile phone apps but although it's a procedure or a roadmap of it. In simple words mobile app development can be generalized as execution of any level-headed development for any kind of devices which can be either Smartphones, Tablet Devices, Smart Watches, Smart Televisions etc. that can do discrete engagement upon that particular device. Mobile App Development reflects an appropriate peculiar feasibility for single person development team to create or develop undeniable, feasible, consequential mobile app in a short span of time. In this Research Paper we will look upon the procedure, functionality, implementation, and benefits of Flutter using Dart as Programming Language to develop mobile app for Cross Platforms that will operate on both Android OS and iOS.

## II. METHODOLOGY

While Developing an App or simply before starting of development of an app a development procedure or a methodology is entailed for a systematic development of the app which is an indispensable conformation of the management. Although some of the methodologies are as demonstrated.

### A. Waterfall Methodology

Earlier User Experience was an ascertain consideration in application development so Waterfall Methodology was the evergreen methodology or proposition among the developers. In the Waterfall Methodology each and every progression of the app development is followed up sequentially following that procedure is forwarded up to the next step only if the previous step is finalized. The only drawback of Waterfall Methodology is progress can't be reverted to the previous progression. [1]

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## B. Prototype Methodology

Prototype Methodology can be stated as Incremental Methodology also as while encroaching towards the composition of the mobile app firstly developer requisites the necessities of the same and originate a kind of prototype or dummy version of the mobile app. [1]

## C. Spiral Methodology

The Risk Driven Methodology is another synonym for Spiral Methodology as this paradigm of methodology is coalescence of both Waterfall Methodology and Iteration Methodology as while developing the app the pre-requisites are defined at the earliest stage of app development phase before knowing the outcomes of the app resultant at the final development phase.[1]

## D. Agile Methodology

Agile Methodology is generally considered as the project management methodology for management of trailblazing Software whether it's a general-purpose software, mobile application etc. This methodology distributes a humongous phase of the development into various minute phases onto to which developers work upon in teams and later after achieving or finalizing the task that's various minute tasks are later coalesce as the original task of the development phase.[1]

## III. APP DEVELOPMENT RECAPITULATION

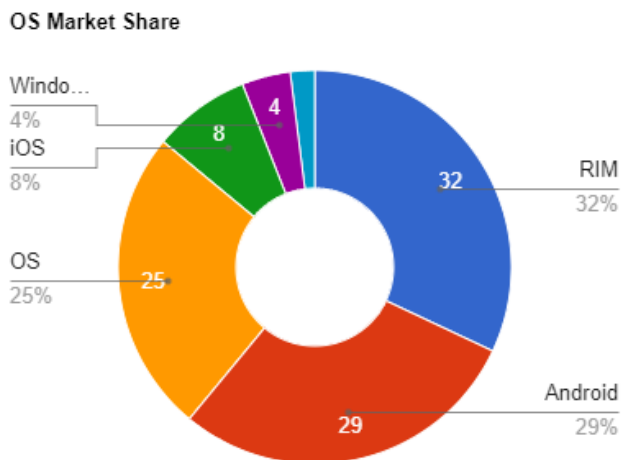


Fig. 1: Mobile OS Market Share

Mobile App Development is the procedure of developing a software that can be primarily operate on portable digital devices such as a Mobile Phones, Smart Phones, Tablets etc. It is a that kind of division that is repeatedly inflating and is now becoming very requisite to every business we can possibly imagine. Although there are many other kinds of devices that are obtainable in the market which follows up Android OS and iOS account for the majority of sales. Now talking upon the Mobile OS Market Share during the Mobile App Development plays a paramount role as developers can speculate the inclination and develop the app according to user's/industry's necessity. Below is the graph of mobile OS market allowance around the globe.[3]

## IV. APP DEVELOPMENT INDUSTRY IN INDIA

Almost in every business and every area is currently being repercussed by technological unsettlement in the app development sector. In order to stay ahead of each anticipation and customers and to demeanor business with them, the majority of businesses nowadays require a mobile app, nonetheless of industry. Indian app developers have comprehended a humongous boost in their altogether income proffering from mobile applications over the past several years on both the Google Play Store (Google) and the Apple App Store (Apple). The nation has the most downloads altogether across both platforms as well.[2] The most admired app category among Indian users is video streaming, which includes applications like Netflix, and is followed by dating apps like Tinder, if we were to make our decision purely on the income generated by the apps is crystal clear when the app categories are displayed according to the quantity of downloads, the ranks shift. Below is the graph of most used or downloaded apps in India according to some surveys. [2]. According to the infographic below, which represents a quarter of all mobile app downloads in India in 2019, shopping was the most popular app category, Entertainment applications were in second position with an accountability for 16% of all app downloads in India in 2019. With a 15% share of all downloads, video games took third place, and the fourth spot went to lifestyle applications. Perhaps to the surprise of many, communication applications came in fifth. [2]

## V. EXISTING PROBLEMS

There are many applications that are available in market and is are also utilized by users Although many chatting/communications/messaging applications which are used by different user either on their android devices or on their iPhones have different features of their own but still they lack in some of the functionalities which are:

**A. Chatting apps lack interoperability:** There exist a highly fragmented mobile chat ecosystem which means that if you are a WhatsApp user, you cannot chat with a We Chat user or any other kind of app. We are researching and trying to create an environment where this kind of interoperability is finished. [4]

**B. Users are worried about security:** One of the major challenges of a chatting app companies face is how to provide security and verification for in-app purchases. Is a simple password adequate? Should there be two-factor authentication in the form of a one-time passcode (OTP) via SMS text? We are trying to create a chat app that a user can use without thinking about his/her app's security and will be prone to data theft. [4]

## VI. APP DEVELOPMENT LIFE CYCLE

Today, it is clear that most digital media consumption takes place on a handheld device, apps with accountability for 90% of all time spent on a phone outside calls and SMS.



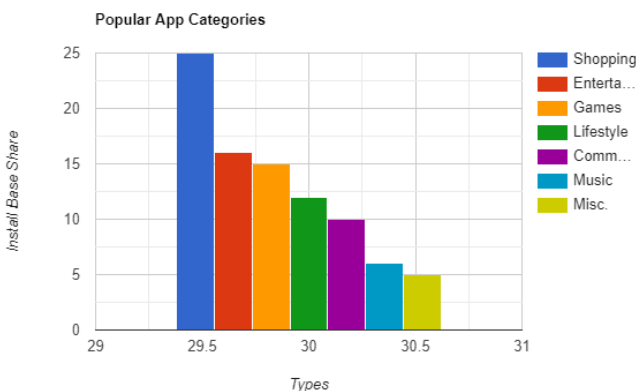
A mobile app's creation is not as complicated as it seems. The numerous sorts of app development that are feasible have previously been observed. Now, regardless of how difficult the app being produced is, let's examine the App Development Life Cycle of a normal mobile application development project. [5]

**A.Objectives and Pre-requisites**

Setting the goals for developing an app is a requisite step during the procedure where the client wants to provide goals that the app must be able to carry through. Additionally, at this phase, it is ensured that all of the app's technical and non-technical needs are well documented. In this stage, the developer has a thorough knowledge of the issue description and the client's needs. For Example:

1. Who are earmarked patrons?
2. How will the app benefit their users?
3. What contrivance will be needed for development of the app?

At the conclusion of the First Stage, we must be able to acknowledge to a number of questions, including those listed above. Finding a way for this software to be streamlined and expand its capabilities for the business needs is also crucial. The majority of the time, an app's success is determined by its vision for the future since it must endure on its own in a world where today's newest technology may become outdated tomorrow. [5]

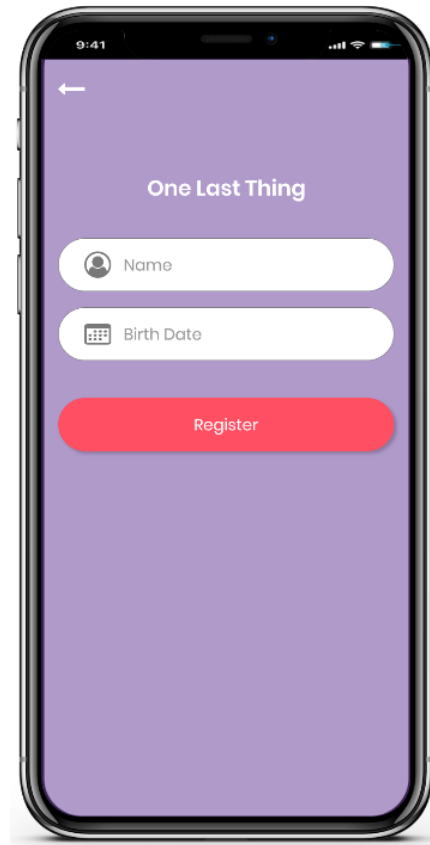


**Fig. 2: Major App Categories Downloaded in India**

**B.Application Designing**

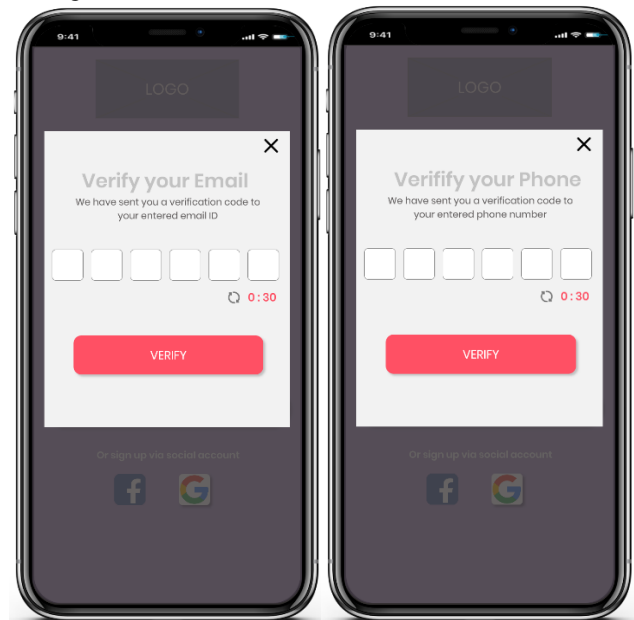
It becomes evident what the app will be giving if the objectives of the app are made explicit. We should be able to develop an exemplification and a depiction in the following phase of the development. We must centralize on both the User Interface and the functionality that users would anticipate from the app during this time. Wireframing or Screen Blueprinting is a frequent practice for creating a workable user interface exemplification. We can create the basic scaffolding for our app using screen blueprint. It helps designers and developers alike better grasp the app's functioning and the UI design process. The steps or phases which are implied in Wireframing are as follows. [6]

**C.Navigation Designing**



**Fig. 3: Registration Screen**

The built registration verification module is depicted in the above figure for first-time users to get registered, or simply creating their IDs for the first time.

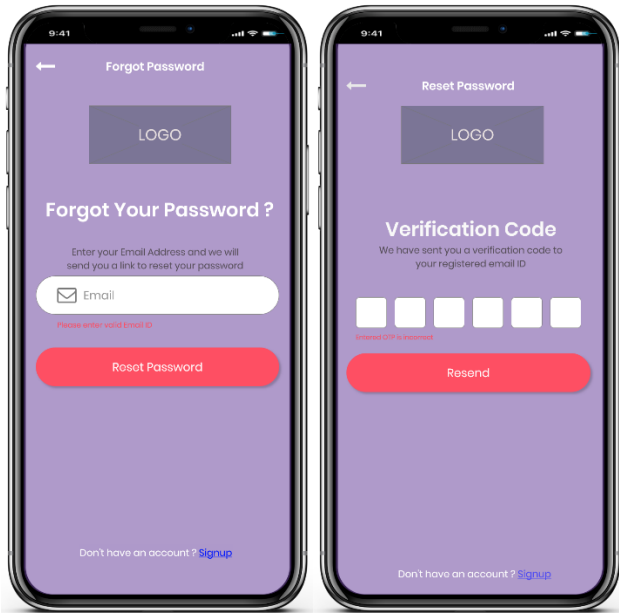


**Fig. 4: Registration Verification Screen**

The built registration verification module is depicted in the above figure for first-time users to get registered and verified, or simply validated after creating their IDs for the app's ongoing usage.



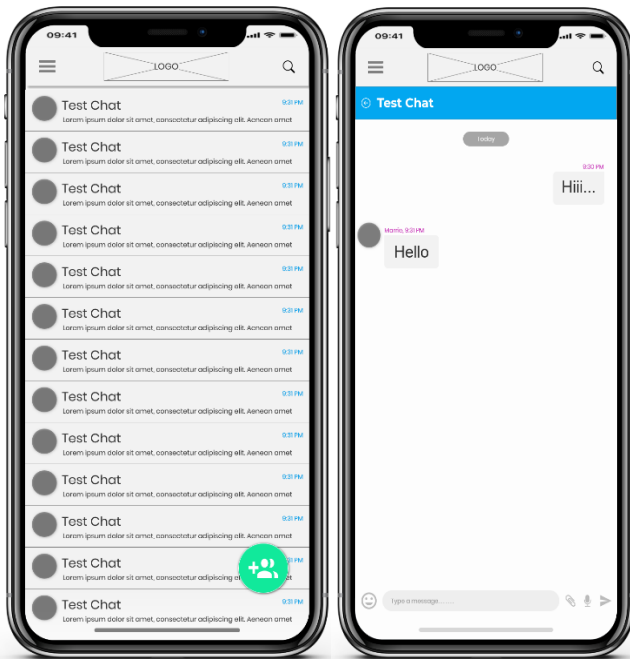
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**Fig. 5: Forgot & Reset Password Screen**

This built-in page, like any mobile app, shows the forgot and resetting of the password for the user in case they lose their password or decide to create a new one.

## D. Interface Designing



**Fig. 6: Chat UI Screen**

This is the built main menu and chat screen of the app that is currently under development, it appears to be a standard chat app screen, but it was created with the aid of Flutter and Dart as the programming language, giving it an advantage over other development tools like Android Studio for Android and Swift for iOS. By using Flutter as the console and Dart as the programming language, we can deploy the same app simultaneously across both platforms.

## E. Plumping for Backend

Every program or application will require data storage, but the location of that storage will vary depending on the type of data, the cost, and the efficiency of the storage environment. Users may often store data in the phone's memory either as

key-value pairs of information commonly recorded in XML format or even in a relational database like SQLite, Cassandra, MongoDB, or Firebase etc. [7]

## F. Development of Application

Once there is a clear understanding of what is required and how it must be done once the first two steps have been completed successfully. The next step would be to begin developing the app using the planning, designing, and lessons learned from the previous stages. The developer is then free to designate the type of development environment and what they would like to work upon. Depending on what the software is intended for or what are the other options. For Example: Like while developing the application on what Platform the developer will work upon like there are many software's that are available in the market as Android Studio by Google Developers or Visual Studio Code by Microsoft while adding the Dependencies into them. So, it's totally depended on the Developer to choose from. Secondly, what kind of Programming Language is being utilized by the developer for creation of the app like whether its Java, C#, Kotlin or Swift etc. [5]

## G. Testing

It is crucial that we regularly test the app once it has been developed with all of its features in order to associate any faults it may acquire. To associate any technological issues which the app may have, it should be thoroughly tested in a variety of real-world situations. It is usually advised that the team that tests the app is not the same team that developed it since there is a significant likelihood that they may overlook anything. There may be more problems and insights that the development team cannot see as being evident to them. [6]

## H. Deployment

The platforms where we require consumers to formally download the app determine when the app will be released. They each have their own procedures for evaluating the software, so it may be the Apple App Store or the Google Play Store. When it is completed successfully, the app is declared to be published, and users can begin downloading it to their mobile devices. [8]

## I. Maintenance

The continuous upkeep of that software after its original release is the last step, which is what defines this as a life cycle. Users may have discovered situations or problems that were missed during the testing process. These concerns must be addressed so that the app continues to function properly as hardware and software evolve. If this step is skipped, the app will eventually become obsolete, hence it is critical that developers continue to keep an eye on the app's viability and usability for as long as it is required. [9]

J. Development Visualization

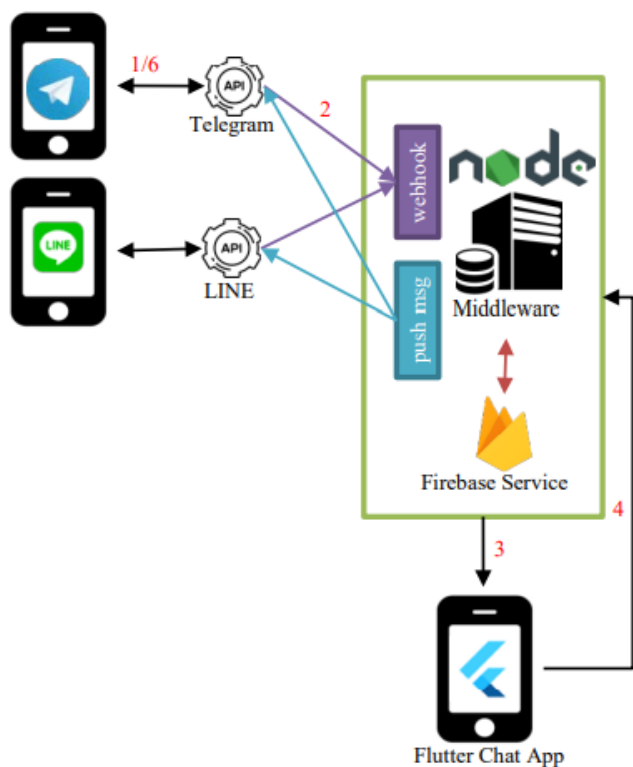


Fig. 7: Development Architecture

This above figure represents the actual designing or development of the app or any app which includes the following points: The first and most basic step while developing an app is to create an outline and draw the functionalities of it. Later on create front-end of the app which is done by coding and later on test it to check whether the app is functioning correctly or not and after finalizing create back-end for the app. Now it can be a little intimidating to combine front-end and back-end programming, especially if you're new to web development or app development. Yet, there are methods to make things simpler, so don't panic. Using a framework like NextJS, which combines both front-end and back-end elements, is one choice. NextJS is a fantastic option if you're already familiar with React, like we did while creating WordfixerBot. Moreover, NextJS has support for APIs and other back-end features, making it simple to link your front-end and back-end code. Using a language like JavaScript that can be used for both front-end and back-end development is an additional choice. For front-end and back-end development, JavaScript is quite popular, and there are a tonne of tools and frameworks available to help you create full-stack JavaScript Apps.

VII. CONCLUSION

The global leader in mobile app development has already outperformed other IT-related or IT-enabled industries in terms of revenue. People who would never have considered using software now work in this industry, which has rapidly changed and increased in their entire lives and are now professionals at using a smart phone and all of its necessary apps can offer. But more can be achieved in chatting applications like watching upon the existing problems like

for instance interoperability is the biggest challenge for major companies that provides chat app services and we are also going through to overcome this challenge in upcoming time.

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Authors Contributions	Shivam Jadaun (Abstract, Introduction and App Architecture, Front-End Development), Rajeev Kumar Singh (Backend Development), Rohit Kumar (Front-End Development), Dr. Krishna Kant Agarwal (Guide)

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