THE NEW COLLEGE (AUTONOMOUS), CHENNAI-14.

Department of Computer Applications – Shift - II

Study Material

Subject: Mobile Application Development (20BHM617) Class: III BCA

UNIT – I

1. INTRODUCTION OF MOBILE APPLICATIONS

A **mobile application** or **app** is a computer program or software application designed to run on a mobile device such as a phone, tablet, or watch. Mobile applications often stand in contrast to desktop applications which are designed to run on desktop computers, and web applications which run in mobile web browsers rather than directly on the mobile device.

Apps were originally intended for productivity assistance such as email, calendar, and contact databases, but the public demand for apps caused rapid expansion into other areas such as mobile games, factory automation, GPS and location-based services, order-tracking, and ticket purchases, so that there are now millions of apps available. Many apps require Internet access. Apps are generally downloaded from app stores, which are a type of digital distribution platforms.

The term "app", short for "application", has since become very popular; in 2010, it was listed as "Word of the Year" by the American Dialect Society.

Apps are broadly classified into three types: **native apps, hybrid and web apps.**

Native applications are designed specifically for a mobile operating system, typically iOS or Android.

Web apps are written in HTML5 or CSS and typically run through a browser.

Hybrid apps are built using web technologies such as JavaScript, CSS, and HTML5 and function like web apps disguised in a native container

Types

Mobile applications may be classified by numerous methods. A common scheme is to distinguish native, web-based, and hybrid apps.

1. Native app

All apps targeted toward a particular mobile platform are known as native apps. Therefore, an app intended for Apple device does not run in Android devices.

As a result, most businesses develop apps for multiple platforms. While developing native apps, professionals incorporate best-in-class user interface modules.

This accounts for better performance, consistency and good user experience.

Users also benefit from wider access to application programming interfaces and make limitless use of all apps from the particular device.

Further, they also switch over from one app to another effortlessly.

The main purpose for creating such apps is to ensure best performance for a specific mobile operating system.

2. Web-based app

A web-based app is implemented with the standard web technologies of HTML, CSS, and JavaScript. Internet access is typically required for proper behavior or being able to use all features compared to offline usage. Most, if not all, user data is stored in the cloud.

The performance of these apps is similar to a web application running in a browser, which can be noticeably slower than the equivalent native app.

It also may not have the same level of features as the native app.

3. Hybrid app

The concept of the hybrid app is a mix of native and web-based apps. Apps developed using Apache Cordova, Flutter, Xamarin, React Native, Sencha Touch, and other frameworks fall into this category.

These are made to support web and native technologies across multiple platforms. Moreover, these apps are easier and faster to develop.

It involves use of single codebase which works in multiple mobile operating systems

2. MARKETING AND BUSINESS DRIVERS FOR MOBILE APPLICATIONS

2.1. MARKETING DRIVES FOR MOBILE APPLICATIONS

1. **Mining Customer Data for Decision Making**

Apps can be used to mine user data. The easiest way to do this is by attaching the app to a cloud. This will allow marketing and sales representatives to study and process data to find trends through long term monitoring.

They can use the data to create more effective strategies based on unchanging behavioral patterns found from the organization's user base.

If you create a customer-friendly app and monitor how users are engaging with it, you will be miles ahead.

2. **Expanding your Audience**

An app will expand audiences because people can easily connect to your business through it. You get the opportunity to communicate with a wide audience effectively, instead of restricting them seeking you online.

On a global scale, this is a significant increase in accessibility, as you may have been drawn back by geographical location.

Having an app will make your brand available around the world, not just for a niche or for local people. Simple activities such as switching to a mobile-friendly theme can go great lengths when it comes to user engagement and mobile search rankings.

3. **Using Push Notifications**

Push notifications are an effective and efficient way for app developers to remind users of updates or opening the app. For a business, it informs users about new deals, products, and services.

All these notifications are located on the lock or home screen of their smartphone but aren't intrusive. It allows turning off unwanted notifications, which is better than desktop site pop-ups that users lack control over.

Push notifications need a whole marketing strategy. You must be keen on word usage and timing because you have limited patience and time in which you operate.

For example, frequent notifications may make users uninstall your app. Also, even if the timing is perfect but there are too many words or it sounds poor, you may get a swipe away.

Always test your push notifications carefully as you would with other marketing content.

4. **Pay special attention to Long Term Metrics and Strategies**

A singular boost in engagement or traffic upon first launching your app indicates success. But you must take into account how that measures up in the long term.

Impressive short term results don't necessarily mean you will be successful in the long run. But it is at least a good way to start something you have to maintain.

Long term plans are always important for businesses, in line with this you must create an app strategy that focuses on the long haul.

Getting customer's feedback before developing an app is the best way to achieve this. Also, you should create a clear, realistic roadmap for features that will help customers in the months and years ahead.

5. **Simplify Signing Up and Use**

This is the most important and basic step that developers tend to miss, and it can water down your efforts. Your app must be usable from the first to the last step. You should make it simple to sign up using social media including Facebook or to attach it to a website.

Make the interface easy and clean to work on many types of screens, using the latest adaptive design techniques. Every part of it should be very clear, especially in the settings.

6. **Connecting the Dots**

Your phone apps are like your whole life consolidated in one small device. Making a good business app can become an important element that connects your service and products to your customer's life.

The best test for your prototype is giving it over to kids to play with it. If they have trouble with something, users will have it too.

2.2. BUSINESS DRIVES FOR MOBILE APPLICATIONS

1. Better Response

With an app, you can respond to your customers in a timely and effective manner. Apps are very effective in tracking rising customer's demand and accessing customer's information.

Developing a good app will help you stand out in the crowd in many ways. Be sure to include all the important features in your mobile app development.

2. Customer Loyalty Value

The power of a mobile app can be reliable, and it builds the customer's trust. There are many ways to do this. For example, providing customers a chance to review a product or service through a mobile app or helping customers locate the nearest seller of a product they are looking for.

By building customer loyalty, you will find more returning customers and increase the chances of long term survival.

3. Innovative Approaches

No matter the type of business you run, your existing customers will contact you at some point. Including an app in your marketing mix can simplify the process of contacting you.

When customers access your app, they can find out service or product availability without having to call. This creates convenience for them and that means less trouble for you.

4. All Time Visibility

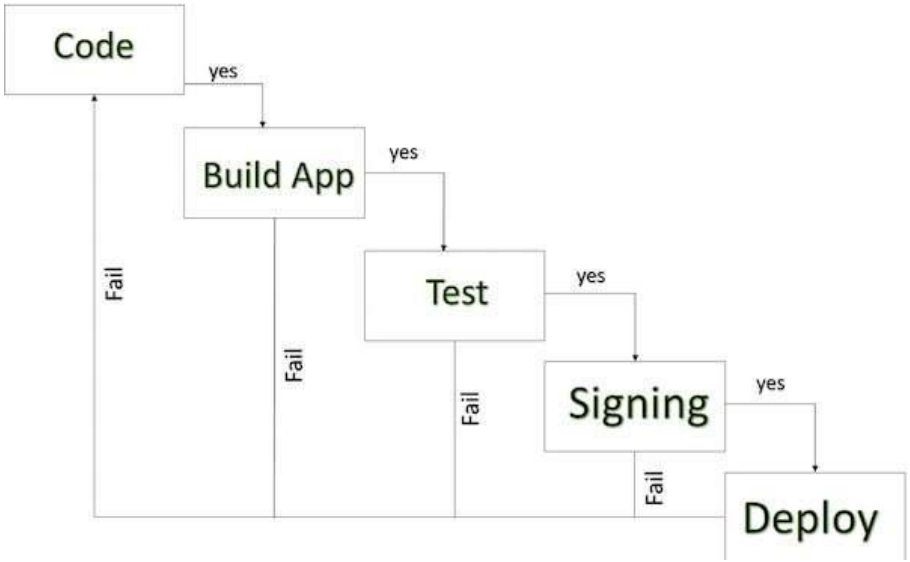
There is no doubt that anyone who owns a phone has installed an app. The truth is that some apps out there enjoy full-time visibility. If your app is relevant and has featured a function for users to engage with your business, they will most likely use it beyond the initial download.

5. Direct Marketing Channel

An app gives you the opportunity to be ever-present with your target audience and by providing marketers a direct means of communication with customers. Specifically, the push notification feature allows you to inform customers about new arrivals, and send them reminders about your service or product at any time.

3. PUBLISHING AND DELIVERY OF MOBILE APPLICATIONS

Android application publishing is a process that makes your Android applications available to users. Infect, publishing is the last phase of the Android application development process.



Android Development Life Cycle

Once you developed and fully tested your Android Application, you can start selling or distributing free using Google Play (A famous Android marketplace). You can also release your applications by sending them directly to users or by letting users download them from your own website. You can check a detailed publishing process at Android official website, but this lesson will take you through simple steps to launch your application on Google Play.

SIMPLIFIED CHECK LIST FOR LAUNCHING YOUR ANDROID APPLICATION:

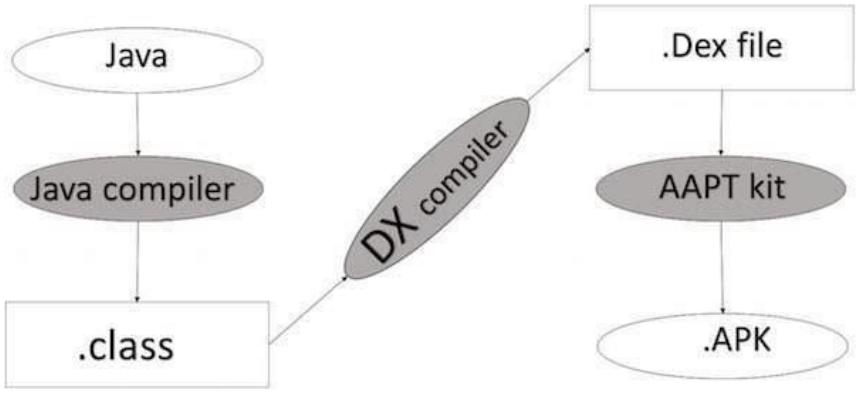
Step	Activity
1	**Regression Testing** Before you publish your application, you need to make sure that it's meeting the basic quality expectations for all Android apps, on all of the devices that you are targeting. So perform all the required testing on different devices including phone and tablets.
2	**Application Rating** When you will publish your application at Google Play, you will have to specify a content rating for your app, which informs Google Play users of its maturity level. Currently available ratings are (a) Everyone (b) Low maturity (c) Medium maturity (d) High maturity.
3	**Targeted Regions** Google Play lets you control what countries and territories where your application will be sold. Accordingly you must take care of setting up time zone, localization or any other specific requirement as per the targeted region.
4	**Application Size** Currently, the maximum size for an APK published on Google Play is 50 MB. If your app exceeds that size, or if you want to offer a secondary download, you can use APK Expansion Files, which Google Play will host for free on its server infrastructure and automatically handle the download to devices.
5	**SDK and Screen Compatibility** It is important to make sure that your app is designed to run properly on the Android platform versions and device screen sizes that you want to target.
6	**Application Pricing** Deciding whether you app will be free or paid is important because, on Google Play, free app's must remain free. If you want to sell your application then you will have to specify its price in different currencies.

7 **Promotional Content** It is a good marketing practice to supply a variety of high-quality graphic assets to showcase your app or brand. After you publish, these appear on your product details page, in store listings and search results, and elsewhere.

8 **Build and Upload release-ready APK** The release-ready APK is what you will upload to the Developer Console and distribute to users.

9 **Finalize Application Detail** Google Play gives you a variety of ways to promote your app and engage with users on your product details page, from colorful graphics, screen shots, and videos to localized descriptions, release details, and links to your other apps. So you can decorate your application page and provide as much as clear crisp detail you can provide.

EXPORT ANDROID APPLICATION PROCESS



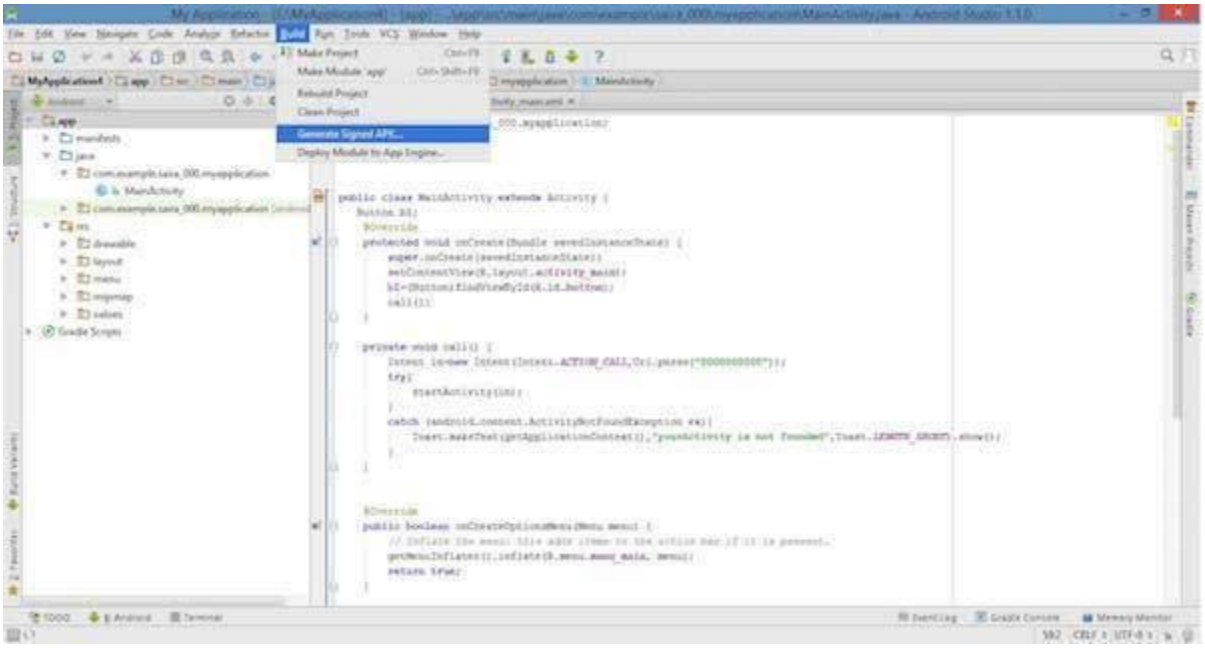
APK DEVELOPMENT PROCESS

Before exporting the apps, you must some of tools

- **Dx Tools** (Dalvik executable tools): It going to convert **.class file** to **.dex file**. it has useful for memory optimization and reduce the boot-up speed time
- **AAPT**(Android Assistance Packaging Tool):it has useful to convert **.Dex file** to**.Apk**
- **APK** (Android Packaging Kit): The final stage of deployment process is called as .apk.

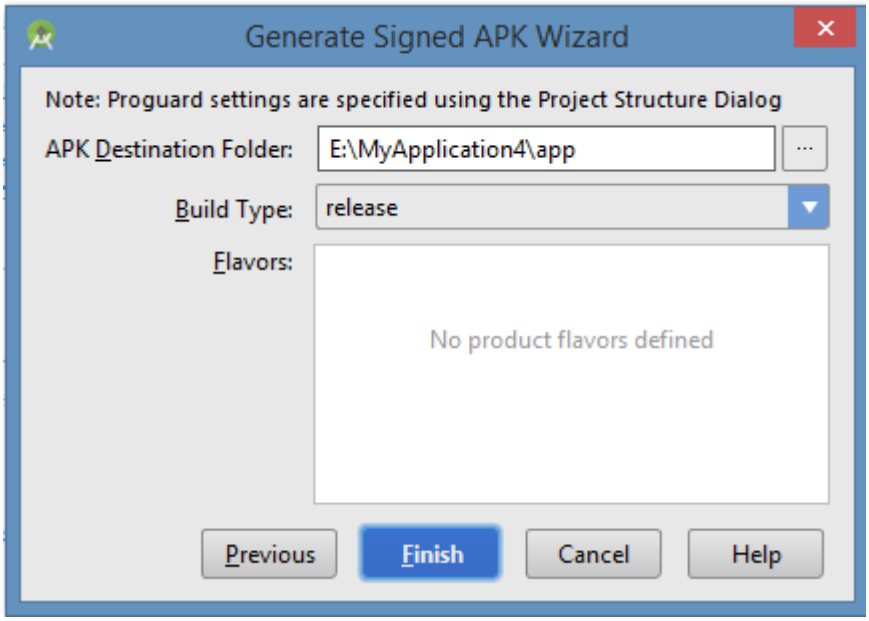
You will need to export your application as an APK (Android Package) file before you upload it Google Play marketplace.

To export an application, just open that application project in Android studio and select **Build → Generate Signed APK** from your Android studio and follow the simple steps to export your application −



Next select, **Generate Signed APK** option as shown in the above screen shot and then click it so that you get following screen where you will choose **Create new key store** to store your application.

Enter your key store path, key store password, key alias and key password to protect your application and click on **Next** button once again. It will display following screen to let you create an application −



Once you filled up all the information, like app destination, build type and flavors click **finish** button while creating an application it will show as below

Finally, it will generate your Android Application as APK format File which will be uploaded at Google Play marketplace.

4. REQUIREMENT GATHERING AND VALIDATION FOR MOBILE APPLICATIONS

4.1. REQUIREMENTS GATHERING FOR MOBILE APPS

- Define the App's Purpose and Objectives.
- Identify User Personas and Scenarios.
- Conduct User Research and Feedback.
- Define Functional and Non-functional Requirements.
- Prioritize Requirements.
- Create User Stories and Use Cases.
- Leverage Prototyping and Wire framing.
- Implement an Agile Approach

In the era of smartphones and mobile technology, mobile app development has become a significant avenue for businesses to engage with their target audience. To ensure the success of a mobile app project, it is essential to have a robust requirements gathering and management process in place. This blog post will guide you through the key steps involved in gathering and managing requirements for mobile app development.

Define the App's Purpose and Objectives

Start by clearly defining the purpose and objectives of your mobile app. understand the problem it aims to solve and identify the goals it should achieve. Consider the target audience, their needs, and how the app will provide value to them. Having a clear understanding of the app's purpose sets the foundation for gathering relevant requirements.

Identify User Personas and Scenarios

To gather requirements effectively, it is crucial to understand the target users of your mobile app. Create user personas which represent different types of users and their characteristics, preferences, and goals. Also, identify various user scenarios or typical interactions users will have with the app. This information helps in eliciting user-centric requirements and designing a user-friendly experience.

Conduct User Research and Feedback

To gain deeper insights into user needs and expectations, conduct user research and gather feedback from your target audience. This can be done through surveys, interviews, or usability testing sessions. By involving real users in the requirements gathering process, you can gather valuable feedback and ensure that the app addresses their pain points effectively.

Define Functional and Non-functional Requirements

Functional requirements outline what the app should do and the features it should include. Identify the core functionalities which align with the app's purpose and objectives. Non-functional requirements, on the other hand, focus on aspects such as performance, security, usability, and compatibility. Define both sets of requirements clearly to provide a comprehensive understanding of the app's functionality.

Prioritize Requirements

Given the limited resources and time constraints in mobile app development, it is crucial to prioritize requirements. Collaborate with stakeholders, including project managers, developers, and end-users, to identify the most critical and high-impact requirements.

Create User Stories and Use Cases

User stories and use cases are effective tools for capturing and communicating requirements in mobile app development. User stories describe app functionalities from a user's perspective, highlighting their goals, actions, and expected outcomes. Use cases provide detailed scenarios of how users interact with the app and the system's response. These artifacts help developers understand user requirements and guide the app's development process.

Leverage Prototyping and Wire framing

Visualizing the app's interface and user flow is essential for effective requirements management. Utilize prototyping and wire framing tools to create interactive mock-ups or low-fidelity designs that showcase the app's structure, navigation, and key features. These visual representations facilitate stakeholder feedback and validate requirements before investing significant development effort.

Implement an Agile Approach

Mobile app development often benefits from an agile approach, allowing for flexibility and adaptability to changing requirements. Adopt an iterative development process, such as Scrum or Kanban that incorporates regular feedback loops and frequent releases. This enables continuous refinement of requirements based on user feedback and evolving market needs.

4.2. REQUIREMENTS VALIDATION FOR MOBILE APPLICATIONS

The critical aspects or risks taking into account in the validation of mobile applications are accessibility and control of the end-user, device connectivity, variety of devices and operating systems and integrity, and privacy of information.

How to validate your mobile app idea: 6 steps to take

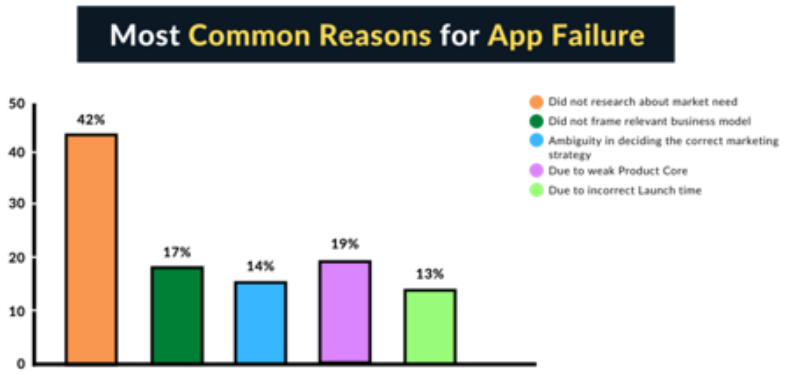
- Ensure your idea solves a problem.
- Do thorough market research.
- Define user personas.
- Create a user journey map.
- Develop a minimum viable product.
- Finalize the mobile app's design.
- How can DECODE help you validate an app idea.
- But we don't stop them.

Ensure your idea solves a problem

The most important step in validating your app idea starts with one simple question: "*What problem is my app trying to solve?"*

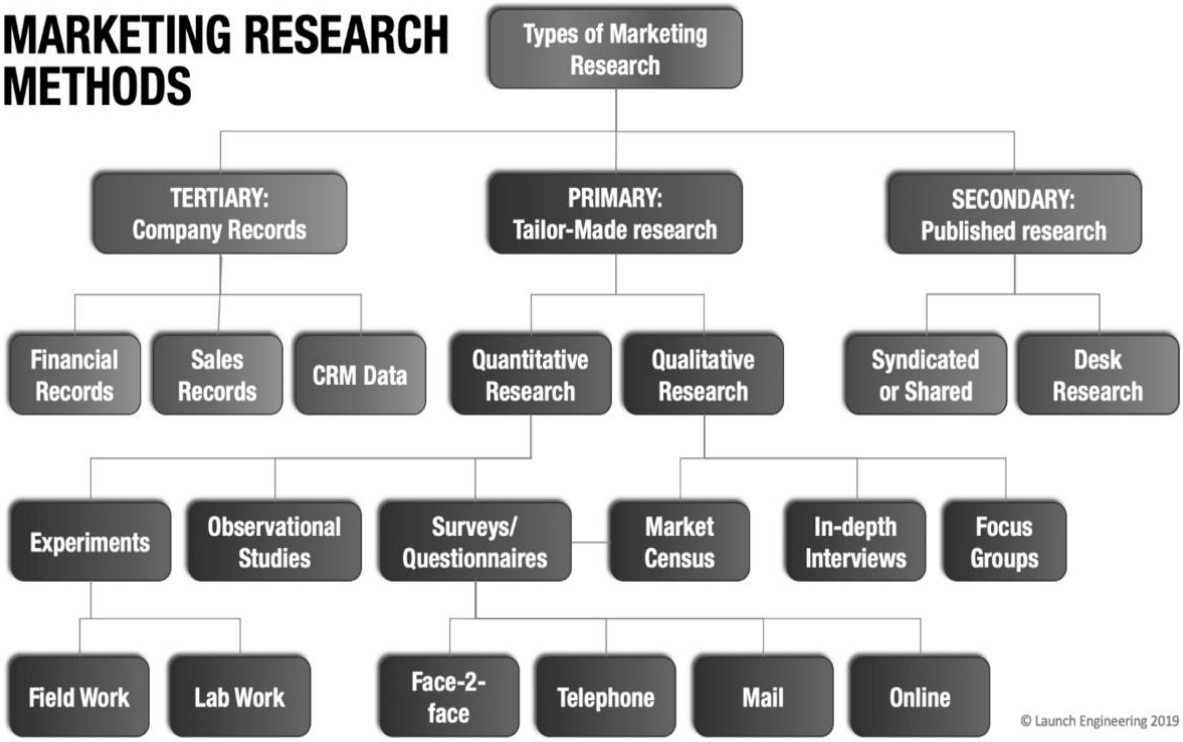
An app should exist to tackle a real problem that your target market has. Otherwise, people will have little use for it—no matter how innovative it is.

No wonder that lack of a market need is the top reason apps fail.



Do thorough market research

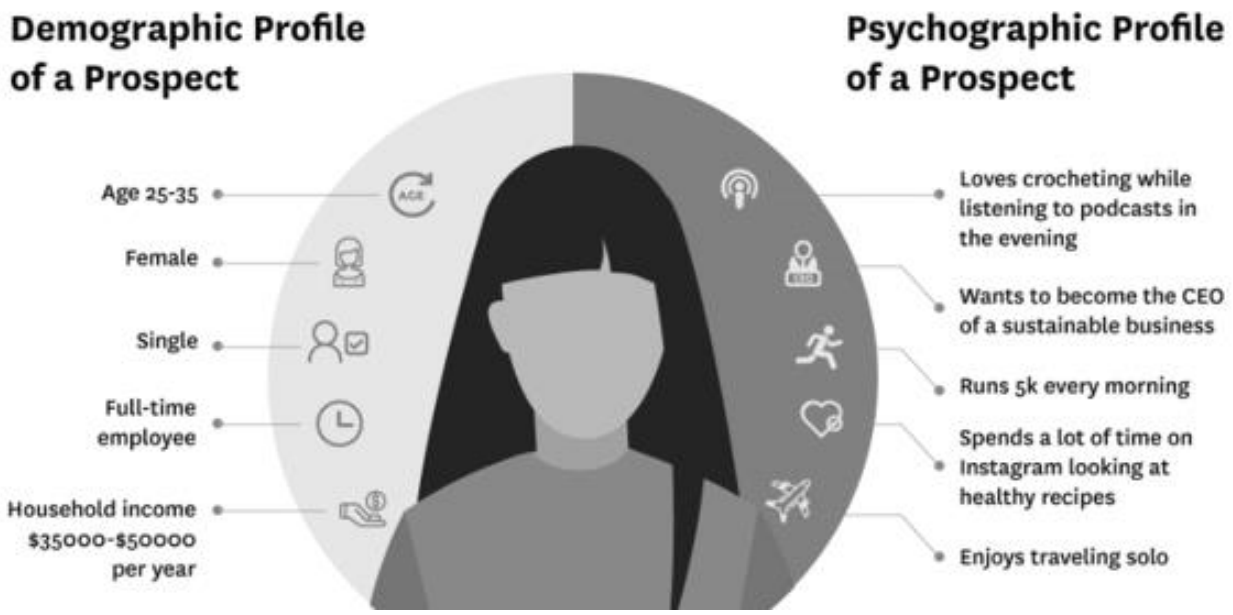
Once you have a rough idea of the problems you want your app to tackle, the next step is to validate it further with thorough market research. The goal is to determine if enough people actually need a solution to that problem—and if they'll be happy to pay for it. Here are some of the common approaches for market research:



Define user personas

One app validation tool worth mentioning is user personas.

A user persona is a fictional person who embodies your ideal user. They possess the same preferences, goals, pain points, and frustrations that most people in your target market have.



Create a user journey map

A user journey map is a tool that outlines how they will interact with your mobile app.

Because it's framed from a user's point of view, it's a great way to analyze all app touch points and how they'll potentially react to it.

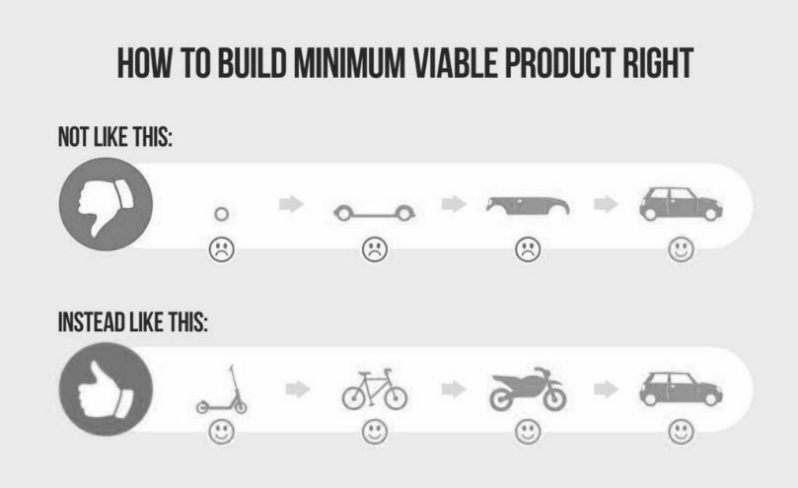
To build a user journey map, you must identify how and when people will interact with your app.

You can then eliminate unnecessary steps or optimize existing ones for a better user experience.

Develop a minimum viable product

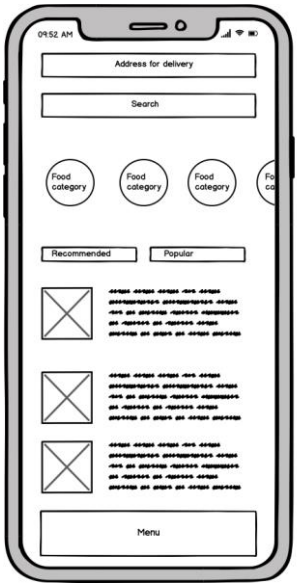
An MVP (minimum viable product) is an early version of your app that contains only the essential features. It aims to have end users test your product and see if it's acceptable to them. MVPs are possibly one of your most powerful validation tools. They give the most accurate feedback because they closely resemble what the final product will look like. However, building an MVP can be tricky. You need to develop it as quickly and cheaply as possible so you can test it right away. But at the same time, you can't sacrifice value

and functionality. The challenge is to get this balance right. Whatever you do, don't make the mistake of putting out an unusable MVP. Every feature you include should still work, even if at only a basic level.



Finalize the mobile app's design

It isn't just the app idea that requires validation. You also need to check if the design is acceptable to end users. See, the user interface (UI) and user experience (UX) are just as important as the functionality. In most cases, even more so. One study showed that 37% of users leave a page or app due to poor design and navigation.



How can DECODE help you Validate an app idea

Validating an app idea is a critical and delicate process. Get it wrong, and you could start on the wrong foundation, which could eventually cause your app to fail. That's why it's best to partner with an experienced agency like DECODE to help you through it. We can help validate your idea through a method called product discovery.

But we don’t stop there.

DECODE can help you with other validation methods like wire framing, prototyping, usability testing, or building an MVP. And if you wanted to, we could even be your full development partner, bringing your app from ideation to launch. You’ll be backed by a team sourced from a pool of over 70+ professionals with a diverse range of skills. Rest assured that we’ll have an answer to every obstacle you’ll encounter.

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