

# MOBILE APPLICATIONS



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Mobile internet usage has worked its way into the daily life of smartphone and tablet users, enabling consumers to access and share information on the go. According to Statista and their January 2018 data, the global mobile population amounted to 3.7 billion unique users<sup>1</sup>. Still, mobile internet usage has an even more promising future ahead as global mobile data traffic is projected to increase sevenfold between 2016 and 2021<sup>2</sup>.

What stands out here is the importance of using mobile applications for business, as many of the most popular mobile properties are mainly accessed via mobile apps instead of mobile browsers<sup>3</sup>.

**“Almost all sectors can take advantage of a mobile app. Companies should use it if they want to increase customer engagement and accessibility and if they want to provide innovative solutions”,**

says Joseph Davidton Cadag, a mobile applications topic leader at ERNI in the consulting firm’s Philippines office. Also, using internal applications for employees is beneficial.



## HOW DID THIS TREND EMERGE?

When talking about the history of mobile apps, we also have to consider the evolution of the mobile device itself.

**“The original purpose of the mobile device was making phone calls, and then over time, it was developed to do many other things,”**

says Joseph. During this period, the first “time waster” games began to appear. For example, Nokia introduced the game Snake. Soon, customers began to push for more features. As a result, Wireless Application Protocol (WAP) was introduced with much hype in 1999 and brought the concept of being able to download apps from their manufacturers<sup>4</sup>. Later, the introduction of the first generation of iPhone, with the first functional browser in a mobile device and some preloaded apps, opened a world of opportunities of what a mobile device can do.

## THREE TYPES OF MOBILE APPLICATIONS

A mobile application or mobile app is a piece of software designed to run on mobile devices such as phones, tablets, wearables and so on<sup>5</sup>. By nature, they are small and standalone applications that perform specialised functions. In practice, we encounter three main types of mobile apps: **native, hybrid, and cross-platform**<sup>6</sup>.



<sup>1</sup>[www.statista.com](https://www.statista.com/topics/779/mobile-internet/). (2018). Topic: Mobile internet usage worldwide. [online] Available at: <https://www.statista.com/topics/779/mobile-internet/> [Accessed 13 May 2018].

<sup>2</sup>Cisco. (2017). Cisco Visual Networking Index: Forecast and Methodology, 2016–2021. [online] Available at: [https://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/complete-white-paper-c11-481360.html#\\_Toc484813972](https://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/complete-white-paper-c11-481360.html#_Toc484813972) [Accessed 13 May 2018].

<sup>3</sup>[www.statista.com](https://www.statista.com/topics/1002/mobile-app-usage/). (2018). Topic: Mobile app usage. [online] Available at: <https://www.statista.com/topics/1002/mobile-app-usage/> [Accessed 13 May 2018].

<sup>4</sup>Clark, J. F. (2016). History of Mobile Applications. [online] Uky.edu. Available at: <http://www.uky.edu/~jclark/mas490apps/History%20of%20Mobile%20Apps.pdf> [Accessed 13 May 2018].

<sup>5</sup>Techopedia.com. (n.d.). Mobile Application (Mobile App). [online] Available at: <https://www.techopedia.com/definition/2953/mobile-application-mobile-app> [Accessed 13 May 2018].

<sup>6</sup>Rickard, C. (2016). Choosing the right mobile app for your project: Native vs cross-platform vs hybrid. [online] inoutput.io. Available at: <http://inoutput.io/articles/development/choosing-the-right-mobile-app-for-your-project-native-vs-cross-platform-vs-hybrid> [Accessed 13 May 2018].

# NATIVE APPLICATIONS

are developed with the programming language native to a device. For Android it is **Java**, for iOS it is **Swift or Objective C** and for Windows it is **Microsoft.NET**. Since it is developed natively, it has access to all the libraries of the device and the operating system. The performance is also optimised, and no third-party libraries are needed, just integrated ones. With regard to user experience, it is also better, since a user assistant controls are used, which is a specific standard for that platform. The only disadvantage is that the development cost of a native app is higher. “For example, if we are developing native apps for all three platforms, we have to maintain three sets of expertise - one for iOS, one for Android and one for Windows. Then we have to develop the apps individually and everything from scratch”, explains Joseph.

# HYBRID APPLICATIONS

are web applications originally developed using web technology such as Java Script, HTML 5 or CSS and then wrapped in a specific framework such as Ionic, Cordova or Phonegap so it can work like an application.

**“This is especially applicable if the user or organisation has an existing website and they just want to convert it into an app”,**

says Joseph. This is ideal if the team has the web expertise already, so they can easily use their web technology and knowledge to develop an app. Most likely, it is also less expensive and faster than developing a native application. The negative side is that the performance is not optimised, since an extra layer is needed to deal with the libraries. Also, the user experience and the look and feel might be affected as it is web-oriented. Yet there is no direct conversion to the actual controls of the specific platform.

“Hybrid apps can be useful, for example, in e-commerce. It is also usable for a static website”, explains Joseph. It is suitable for companies which want to convert their website to an app, especially if they are going to maintain it. However, companies have to consider that this option is not really a long-term solution. It is cheaper, but not the best quality.

# CROSS-PLATFORM APPLICATIONS

are native applications developed using an intermediate language, in this case C#, a Microsoft technology. “This is one of our core competencies at ERNI. We can develop an app which will be compliant into different platforms. We develop it once using a C# shared codebase and then using the Xamarin framework we write native apps for iOS, Android or Windows”, says Joseph with confidence. Another major player besides Xamarin is React Native, developed by Facebook. The advantages are similar as for a hybrid application, except that an app developed using a cross-platform is also rendered natively. It is also less expensive since only one codebase is maintained and then it generates three builds automatically.

**The UI performance is probably the same as with a native app, as it is rendered into its native controls. The only negative side is the size of the app.**

The generated app is larger than its native counterparts because there are extra libraries. But other than that, the quality, performance and user experience are comparable with a native app.



As companies nowadays want to support as many platforms as possible, this is probably the most appropriate solution. However, they don't always know about the possibility of developing the app using the cross-platform approach. "Most of our customers are hesitant at first, because the most common thing they have in mind is the native app. However, when we introduce to them the benefits of cross-platform development, then they prefer it over creating an app natively", says Joseph.

If companies want to choose the best development platform, the main criteria to consider are the development cost and whether they want to develop the app just for one or for multiple platforms. Also, they have to make sure that the development tool is properly integrated with some third-party apps. Another thing to think about is the nature of the app – if it is going to be an enterprise app, a consumer app or a game app.

## **BESIDES THIS DIVISION, WE ALSO DIFFERENTIATE ONLINE AND OFFLINE APPLICATIONS.**

### **• ONLINE APPLICATIONS**

have the benefit of having real-time information. The disadvantage is that they are highly dependent on an internet connection. If the connection is off, obviously, the services are cut. If the connection is weak, performance is not that good.

### **• OFFLINE APPLICATIONS**

are suitable especially in scenarios of using an app without having Wi-Fi or good connectivity. The downside is that sometimes users are required to download the master data, and that requires larger memory consumption. Also, the information is not in real time when using it offline.

# EXAMPLES OF APPLICATIONS FROM VARIOUS SECTORS

Development of all three types of applications is also a part of ERNI's Swiss software engineering portfolio. They help many businesses from various sectors to go mobile and provide innovative solutions for their customers. Moreover, these businesses benefit from using multiple internal applications.

## NATIVE

ERNI specialists develop native applications for all three platforms - iOS, Android and Windows. For instance, they have developed a native iOS app targeted for travellers. It includes functions such as explore, search or comparison of locations. Moreover, it has an integrated weather forecast and users can also customise their favourite search terms. "Currently, we are also providing ongoing native app development. Our customer is using a native iOS platform and right now is planning to make an Android counterpart. This is where the disadvantage comes in, because now we have to rewrite everything to Android", says Joseph.

## HYBRID

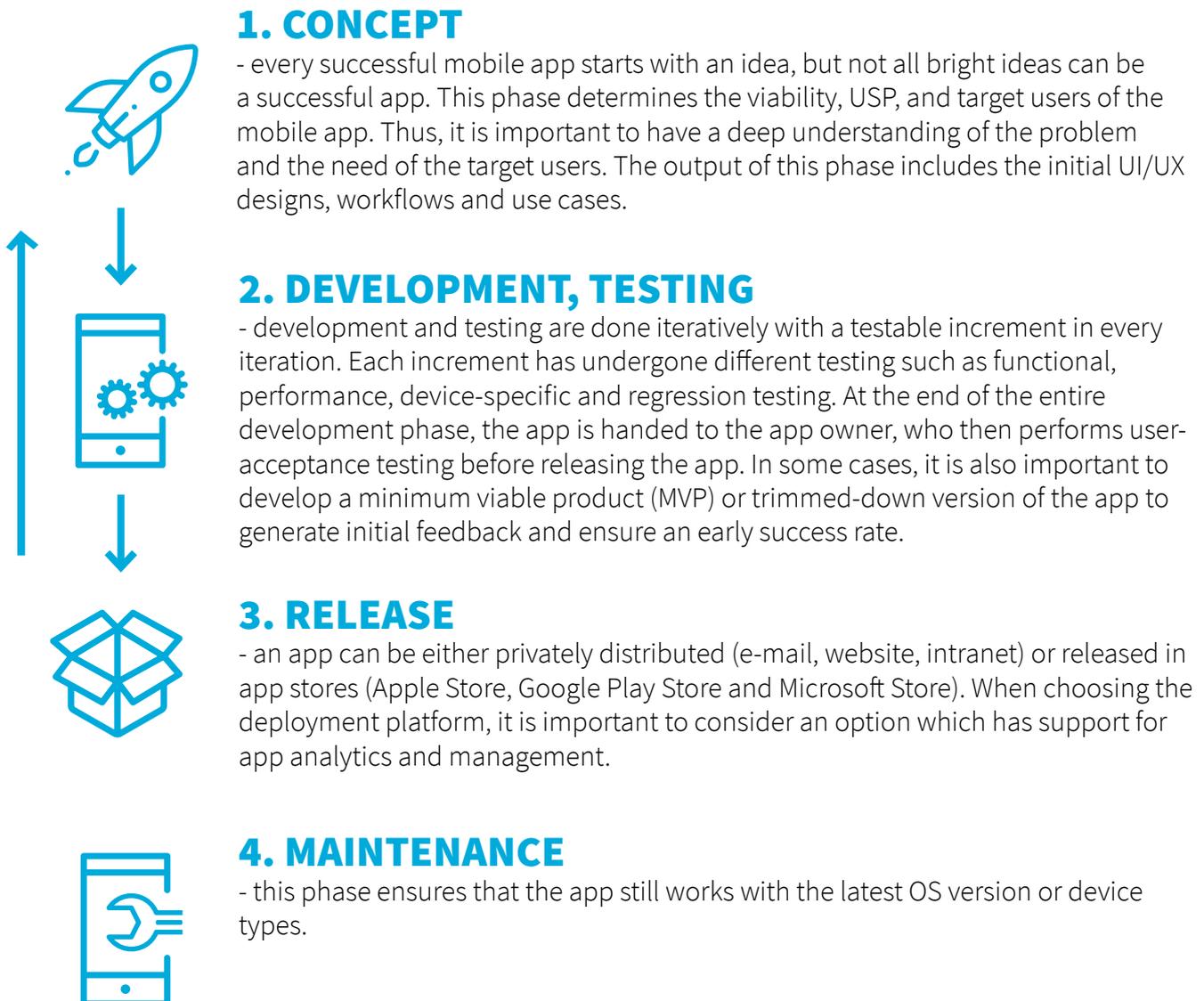
As for hybrid applications, the demand is not as high as for native or cross-platform applications. However, ERNI uses this type of application internally. It is a web application which is compliant to a mobile size. ERNI specialists have developed it using web technology and wrapped it in a web browsers, so employees can install it as an app but can also access it directly using any web browser. It is a one-stop location for all the information related to the company. This is one example of how businesses can use apps also for internal purposes.

## CROSS-PLATFORM

"Most of our applications use cross-platform - Xamarin", says Joseph. They have, for instance, developed a cross-platform application for a customer from the maritime sector which is intended for seafarers worldwide. Before the app, they were using a website to access their information such as payrolls, certifications needed for their job or to send messages to someone else. However, this was not the best solution due to insufficient internet access on the sea. The development team created a build for iOS and Android platforms, and provided an app where all the information is stored and users can access it whether they are online or offline. They can just retrieve it once they have a stable internet connection and can then access it later while they are in the middle of the sea. Moreover, they receive push notifications. At the same time, the app enables seafarers to look up at various job opportunities and manage their application. This innovative solution has also earned a very good rating in the app store. After its launch, the app hit Google Play's trending apps in the top 7, beating apps such as Google Drive and Google Keep.

# APP DEVELOPMENT WORKFLOW

The process of developing a mobile application is not very much different from normal software development. “Since mobile projects are relatively smaller in nature than desktop or enterprise projects, we use the agile method in most cases”, says Joseph. The typical mobile app development process includes conceptualisation and design, development, testing, deployment and maintenance. The mobile app development process is further optimised by applying Mobile DevOps, which supports continuous integration, automated tests, and continuous delivery. “Through mobile DevOps, the development, testing, and release of an app become faster, cheaper and with increased quality”, Joseph adds.



# CURRENT MOBILE APP DEVELOPMENT TRENDS

The statistics clearly show that the future of mobile applications is bright. As the business sector grows, new trends will become the norm. These are some of the top current mobile app development trends that matter in 2018:

- **WEARABLE APPS**

Smart watches and other connected wearables have created an altogether new technology market. While many of these devices can provide standalone features, they still require some support from mobile. However, users prefer wearable devices to be synchronised with their mobile phones for easier access to data<sup>7</sup>. The wearable apps market is currently focused on fitness, but will most probably expand this year.

- **ANDROID INSTANT APPS**

These apps do not require installation and allow users to run the apps instantly. Users just find an app in the Play Store and click “Open App.” They can also jump to a specific activity within an app that they didn’t install. With a shortage of storage space on mobile devices, Instant Apps might become more and more popular this year<sup>8</sup>.

- **MACHINE LEARNING AND ARTIFICIAL INTELLIGENCE**

Machine learning lets developers teach computer programs to recognise complex patterns like objects, sounds and feelings. The ERNI specialists in the Philippines have, for instance, developed some internal apps which use cognitive technology. “We have an app that does OCR - scanning a picture and turning it into text. We also have apps that do face recognition or translation; also an app that recognises an image - if it is a human, animal or whatever kind of object it is. We are strongly investing in that because we know that it is going to be a trend”, says Joseph.

- **AUGMENTED AND VIRTUAL REALITY**

AR and VR on mobile are quite fun. One successful example can be the application Pokemon Go. However, it can also be used for practical tasks. That is why more and more companies are investing in this. “At ERNI, we are working on a couple of AR and VR projects ourselves. We recently completed a prototype to support Warehouse logistics using AR. Currently, we are working on AR of the heart and the brain for educational purposes”, says Joseph.

- **CLOUD-BASED APPS**

These are, for instance, Google Drive or Dropbox. Their advantage is that these apps do not consume that much memory, but at the same time can increase productivity and collaboration.

- **MOBILE PAYMENT**

So be-to-be payment. With online banking already a part of our lives, it was only a matter of time before payments were being made possible via mobile. With the creation of apps like Apple Pay and Google Pay, consumers are now using their smartphones to make their payments. This is easier for them and proves to be another opening in the market for app developers<sup>9</sup>.

- **BIOMETRICS**

Since Apple introduced Touch ID with the iPhone 5s, biometrics have become an integral parameter in mobile phones. However, fingerprint scanning is not the only biometrics solution on the market. Another current trend is, for instance, face recognition. Biometrics are being used majorly in financial, banking, mobile payment and healthcare apps<sup>10</sup>.

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<sup>7</sup>Jain, Y. (2018). Top 10 Mobile App Development Trends 2018 [Infographic]. [online] Newgenapps.com. Available at: <https://www.newgenapps.com/blog/top-10-mobile-app-development-trends-for-2018> [Accessed 18 May 2018].

<sup>8</sup>Zolciak, A. (2018). 20+ Crucial Mobile App Development Trends That Matter in 2018. [online] In'saneLab.com. Available at: <https://insanelab.com/blog/mobile-development/mobile-app-development-trends-2018/> [Accessed 18 May 2018].

<sup>9</sup>Vectonemobile.co.uk. (2018). 10 mobile app development trends in 2018. [online] Available at: <https://www.vectonemobile.co.uk/blog/mobile-app-development-trends-2018> [Accessed 18 May 2018].

<sup>10</sup>Macquin, G. B. (2018). Mobile App Development Trends in 2018. [online] Medium. Available at: <https://medium.com/@goldybenedict/mobile-app-development-trends-in-2018-4cd2a1d0031b> [Accessed 18 May 2018].

