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APP DEVELOPMENT GUIDE

Digital Scotland

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CHAPTER 1
WHAT IS AN APP?

An application, or app for short, is a software programme that can run on a portable device such as a smartphone or tablet. They can fulfil a multitude of functions from weather and news updates, to tracking fitness and keeping up to date on social media. These apps can be found preloaded onto a device from a specific manufacturer (iPhone's iMessage for example), but they can be downloaded from app stores as well.

Many apps have programmes that can run on desktop or the web, but the key to a mobile app is that it utilises the device it's run on, provides a more interactive experience and is easy to use. Therefore, it must be made to particular specs held by a variety of mobile devices (screen size, touch functions etc).

WHERE CAN I GET AN APP?

Regarding mobile apps, these are accessed via app stores which nearly every platform has such as Apple's App Store, Google Play for Android and Amazon's Appstore for Android, and Window's Apps Microsoft Store. Here you will find a selection of free and paid apps to choose from. You can download these through your device.

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CHAPTER 2

WHAT ARE THE REASONS FOR CREATING AN APP?

There are many reasons for creating an app from helping to carry out the simplest of tasks such as checking the weather, to helping with mobile banking. The idea is to create something that will perform a particular task or function for the user. As the market has grown over the years, so too has the variety of apps available to users. From social media and shopping apps, to games and fitness trackers.

When creating an app, it's important to think about why your business might need one and what benefit it will have for you and your customers. Consider the following:

- Do you have a particular service you could offer users that no other app does?
- Can you make your current offerings more efficient with an app?
- Can you enhance the experience of your customers with an app instead of a website?
- Do you want to create a community via your app?
- Do you want to increase your brand's visibility with an app?

WHAT ARE THE BENEFITS?

When creating an app, it is important to think about how it will benefit your business and your customers. As the use of smartphones has increased over the years, so too have the number of apps available to users. But there are a series of factors to consider when making an app, and whether or not it will be worthwhile for your business such as target audience, budget, features and purpose.

Apps are a great way to reach out to new customers and keep engaging with current ones. Here are just a few of the benefits to making an app for your business:

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- **Communication** – An app can help you increase your communication with customers. You can promote your services through an app and build up a community through it
- **Support** – You can provide extra support through an app so that customers can get help wherever they may be
- **Convenience** – Having a link to your services at the user's fingertips will prove to be invaluable to them as they'll no longer be tied to a computer to access your offerings
- **Visibility** – An app offers increased visibility of your brand. Users and potential customers will be able to access your services from anywhere
- **Efficiency** – An app can allow you to manage your business dealings with your customers more efficiently and directly, improving the business's processes and potentially reducing costs in the long run.

WHAT MAKES AN APP USEFUL?

When looking into making an app, you may be wondering what makes an app useful. From a functional point of view, you should think about why you're making the app and consider the hardware functionality that makes the app worth making. Will your app need to use the phone's camera or microphone? Will it need the phone's GPS functionality?

App stores will consider this when it comes to reviewing the app for submission. For example, Apple's criteria for minimal functionality in an app includes some of the following points:

- It should include features, content, and User Interface that lift it beyond a repackaged website
- It should provide a long lasting entertainment value
- An app shouldn't primarily be marketing materials, advertisements, web clippings, content aggregators, or a collection of links
- Your app should work on its own without requiring installation of another app to function.

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Essentially, if your app concept could work just as easily on a website or other platform, your app may not be accepted by the app stores. So it's important to really think about the features it will utilise on the device it's loaded on to and how unique the experience will be for the user.

Some other factors that make an app useful:

- **Target Audience** – The needs of the audience should be considered in order to make an app that they want to use. Conducting user research should aid you in what it is that a user would want and how they might use it
- **Efficiency/ease of use** – The user should be able to use the app easily, and it should be an enjoyable experience when using it
- **Doing the basics** – If for an existing product, the app should do all the basics and hopefully in less time
- **Stability and speed** – It's important to create an app that not only performs well and fast, but is robust and doesn't crash
- **The finer details** – Once you have the form and function down, think about how you can perhaps finesse the app. It's the small details that can often make an app stand out from sound effects produced by certain functions to animations.

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WHAT CAN AN APP BE USED FOR?

Mobile apps can be used for many things including providing general information about a product, news services, ticketing services, shopping, travel information, weather, messaging and much more. Here are just a few examples of some of the areas apps can be used in:

SOCIAL NETWORKING

Companies such as Facebook, Twitter and Instagram have had apps for years allowing for ease of use when on the go. Adding to those are Snapchat, Whatsapp and Facebook Messenger, along with apps for blogging platforms such as Tumblr, and a fair part of the app usage is taken up by social media. The key feature being able to stay in touch whilst on the move.

SHOPPING

In recent years, supermarket chains have ventured into the app world to help make shopping a more efficient experience for their customers. For the likes of Sainsbury's whose app enables you to shop online from anywhere, this has taken the need for having to be at home by the computer or at the shops out of the equation. Other stores such as Waitrose have introduced an app that allows you to scan your products as you go, leaving you to pay at the till and then go.

From grocery shopping to buying tickets, companies such as Trainline and Lothian Buses have got in the app game and make it easier for customers to buy tickets when on the go. Because the tickets are stored in the app, there's now no need to worry about losing your ticket as it will be in your phone.

HEALTH AND FITNESS

As the interest in health and fitness has increased in the digital age with the rise of health blogs and fitness accounts on Instagram, so too has the availability of health and fitness apps. Users can monitor their stats when out running or cycling with apps like Strava. Not only can it track your progress, but it enables you to connect with likeminded individuals, creating a community. From running and other forms of fitness, to mindfulness and meditation, Headspace has become a popular app for those looking to take time out from a busy day.

ENTERTAINMENT & MUSIC

Streaming services have increased in popularity over the years with the rise of mobile technology. Having a music app like Spotify, or a video app like Netflix on the go has become useful for those who commute.

FINANCE

Mobile banking has become very popular as there's often a need to manage money when on the go. Most major UK banks have an app with a simplified version of their services from transfers and payments to offers and branch information. Some apps such as Monzo offer a handy alert system that keeps you up to date with your spending habits.

IS IT THE RIGHT OPTION? (IE WOULD A MICROSITE OR SOMETHING ELSE TO THE JOB?)

If you're unsure an app is suitable for your business or if you create an app and it isn't accepted into an app store, there are other options you can look into such as microsites and progressive web apps, which can potentially cater for your needs.

MICROSITES

Microsites usually consist of a page or set of pages and are an offshoot of a brand or company's site. The nature and purpose of these sites often lend themselves to be a little more creative in style, with a more visual element to them. Microsites can be a good option for the following reasons:

- They're a good outlet for telling the story of the product or campaign more creatively, and make more of an impact
- They can reach a target audience in a more direct manner as the content will be tailored to them
- Due to their size, they can be developed more quickly and can suit a short campaign.

It is worth noting that although a useful alternative to creating an app, the cost of creating and maintaining another site on top of an existing one should be considered.

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PROGRESSIVE WEB APPS

A progressive web app (PWA) is essentially a mobile-optimised site, which offers an app-like experience for the user.
These can be accessed from a browser so don't need to be downloaded to a mobile device.

THE BENEFITS

If an app isn't right for your business, then here are some of the main benefits of going with a PWA:

- The design is responsive and can adapt to different browsers and fit across different screen sizes
- PWAs are fast, providing a good performance
- They don't use as much data as a mobile app
- They can be accessed and shared via a URL link
- Although web based, they can provide as much of an engaging experience as a native app.

A PWA might be a better option if you're working to a limited budget or you want something that can work well across a variety of platforms. This option may end up being more flexible for your business.

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WHAT DO YOU NEED TO CONSIDER IF YOU ARE GOING TO CREATE/ COMMISSION AN APP?

There are a few things you need to think about when creating an app such as the following:

The need for the app – as mentioned previously, it's key to think about the appetite for an app, for both your business and your users or customers. Conducting research into this should help identify whether there is a gap in what your business provides and whether or not an app can bridge this gap.

The budget – You need to consider the budget for the app, which will depend on the scale of the app – How much content will the app have? Will it need a big team to build? How do you want to market it?

The operating system – You should also consider what operating system you wish to have the app developed for – whether you go with Android or iOS, or create something for both. They'll have their pros and cons so it's worth looking into what might be a more suitable platform for your app.

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In-house or outsourced – Depending on the size of your company, you may have in-house developers who can create an app for you, or you may wish to outsource it to an agency or freelancer. This can often depend on the budget you have for the app so it's good to consider your options across the board. By having a developer on board, you will benefit from the skills and years of experience they can bring to the project. As can often be the case, business requirements can change over the course of a project so it's useful to have the technical knowledge and expertise to hand.

Security – This is very important to consider if your app will be handling user data. You should ensure that customer data is kept safe and secure at all points of collection and storage. As of the 25th May, the General Data Protection Regulation will come into force across Europe and this will affect how companies handle user data. More information about this can be found in

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HOW SHOULD I MANAGE PERSONAL DATA?

When creating an app that requires any kind of personal information from its users, it's important to consider the need to collect this information, how it will be used, and how it will be stored. Sensitive data must be protected and come the 25th May, a new set of data protection regulations will come into force across Europe. This is known as the General Data Protection Regulation, or GDPR for short, and will regulate how organisations protect and manage personal data of their users. These rules will apply to apps so it's important to think about how you're going to manage personal data when creating your app. Find out more about GDPR and how it can affect you in our guide here.

Some points to consider when thinking about user data:

WHAT KIND OF ACCESS WILL YOUR APP HAVE TO PERSONAL INFORMATION?

Consider what information is collected from your users and how it's collected. This can be information through a form or information such as location or camera data. Consider how much information an app would need to get from a user in order to function.

It's important to ensure your Privacy Policy is up to date and states clearly what any information gathered will be used for.

SECURITY AND ENCRYPTION

Make sure any data collected and stored is encrypted. Your application should be fully secure and not have any vulnerabilities that could lead to a data breach.

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HAVE YOU GOT CONSENT FROM YOUR USER?

Ensure you get consent from any users before obtaining their data, and request consent in a clear and easy to read manner. You should also be able to prove you asked for consent.

ARE YOUR POLICIES CLEAR ENOUGH?

It's important to make it clear to users what information you're asking for, why and how you intend to use it. They should have a clear understanding when they're giving you their information, but it's also important to make sure documents such as your Privacy Policy are kept clear and up to date for users.

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HOW DOES THE APP ECOSYSTEM WORK? IOS/ANDROID/ WINDOWS ETC

It's long been considered that Apple's App Store and Google Play for Android dominate the market and their own ecosystems have similarities and differences. A variety of apps across different platforms and from different developers/ providers can be found in each store. In terms of submitting an app, it's best to look into each one and see which might work for you and your business.

IOS

Apple's App Store has often been considered the most popular store for app downloads, with the largest range of apps, many of them free or at least reasonably priced, and they have a variety of Google-produced apps including Gmail, Maps and YouTube.

ANDROID

Android has more stores to choose from such as Google Play and Amazon's Appstore, as well as some smaller stores. Often this kind of variety can be enticing to app developers as they have more opportunities to distribute their apps.

MICROSOFT STORE (FORMALLY WINDOWS STORE)

Microsoft has an approach similar to Google in that it creates apps (many of which are their core offerings) that can be available just about anywhere.

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APPLE / ANDROID STORE APPROVALS

Once you've created your app, you'll want to think about where to submit it. There are many stores around today each with their own set of pros and cons to go with them, so it's worth doing the research to figure out where might be the best place to submit. In this guide, we'll look at the Apple and Android store approvals.

APPLE

The Apple App store has a set of requirements for the acceptance of apps into the app store, so it is essential to familiarise yourself with these early on in your app development in order to increase your chances of getting the app accepted. They have recently published a set of guidelines and you can find them here [https://developer. apple.com/app-store/review/guidelines/]. This document takes into consideration key elements such as safety, performance, design, business and legal.

Once you've reviewed the guidelines and ensured your app follows these, you need to register for an Apple developer account. You have to pay an annual fee of £59 for this account but this includes access to features on the iOS Dev Centre, where you'll find videos, documentation, forums and even code samples. The account also gives you access to an iOS Simulator so you can run iPhone and iPad applications on your Mac desktop machine for testing and debugging.

Once you've fully tested your app and feel it's ready for publication, you can upload it to the App Store and submit it to the approval process. You'll need to set the category it will be in, any keywords and the price band. Approvals can take anywhere between a week and a couple of months, so it's important to factor in approval time to the project timing

plan. If the app doesn't meet the store's standards, you will be notified via email of what needs adjusted. You can then resubmit when you've updated the app.

You'll need to consider how much your app might cost, and Apple currently have 85 price bands ranging from "free" to £599 which you can select from. Apple will take 30% of the selling price and will pay you the balance through a direct deposit once a month.

If you're updating your app for any reason, you will need to resubmit it for approval again.

ANDROID

Android stores operate under similar principles as Apple, there's just more choice to go with. You have Google Play for Android, Amazon's App Store for Android, as well as a series of other stores for Android phones. The best option would be to target the most popular stores first as they'll be more of a draw for potential new customers.

Much like the Apple App Store, Android stores have a series of guidelines that should help with the submission process. Looking at Google Play's set up, a user must familiarise themselves with these guidelines before signing up to the store. Once they have, a simple registration fee of $25 (around £18) is needed and there's the option to set up a merchant account for selling through the store as well.

When submitting the app, it's important to test it against the quality guidelines ensuring the product has the basic features and functions that an Android user would expect. The app should also be appropriately priced and described in the submission process as well so users gain a good understanding of what the app is about.

WHAT ARE THE MINIMUM REQUIREMENTS FOR AN APP TO BE APPROVED BY THE APP STORE OWNERS?

As mentioned previously, the Apple and Android stores have a series of steps necessary to take in order to submit your app for approval on their stores. Here is a breakdown of some of the requirements that are useful to note when submitting:

APPLE

- **Make sure the app works** – Test your app for crashes and bugs and ensure that it runs as smoothly as possible
- **Supply correct information** – Ensure that all app information and metadata is complete and accurate when submitting
- **Keep contact information up to date** – App review may need to get in touch with you so it's important you supply the correct contact details and keep them up to date
- **Provide test materials** – An active demo account and login information, plus any other hardware or resources that might be needed to review your app (e.g. login credentials or a sample QR code), may be needed in the course of the app's review
- **Enable backend services** – This is to ensure the app is live and accessible during review

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- **Include extra information** – Your app may have a series of non obvious features or other qualities the store should know about. Be sure to include this information in the app review notes
- **Double check** – Does your app follow guidance supplied in other notes? Cover all bases and make sure it does.

ANDROID (GOOGLE PLAY)

- **Google Play's policy centre** – Be sure to review this as it will give you an idea of what to expect when creating and submitting the app to the store
- **Accurate description** – Give the app an appropriate description ensuring it complies with the store's meta data policy
- **Image/Other content rights** – Only use images, animations and other content you have the rights to
- **Rate the app accurately** – Be sure to provide an accurate rating for the app as this will act as a guide for users to what the content is like. This can be done by filling out a rating questionnaire on Google's Play Console about the nature of the app's content. The app will then receive a rating from multiple rating authorities.
- **Data handling** – Make sure you handle user data carefully and that it's stored safely. Include a Privacy Policy which details this
- **Advertising** – Ensure any ads in your app comply with the policy guidelines.
- **Restricted content** – Double check the app for any restricted content such as adult content, drugs or violence. This includes any user generated content.
- **Contact details** – Keep your contact details up to date should the store need to contact you about anything.

HOW MUCH DOES AN APP COST TO BUILD?

Unfortunately, there isn't a straight forward answer to this. App development costs can depend on a variety of factors:

- The scale of the project
- The complexity of the app
- The platform
- The design
- The size of the team needed to build it
- The rate of the developer/s building it
- The length of time it will take to build
- The length of time it will take to test it
- Whether any long term costs will be incurred to maintain/update it

It's worth researching individuals or companies who make apps and seeing what different rates are out there for the type of app you wish to build.

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WHAT DIFFERENT APPROACHES ARE THERE TO APP BUILDS? (NATIVE/ NON-NATIVE FRAMEWORKS)

There are a number of different approaches you can take to building an app, and it often depends on the needs of your app.

NATIVE APPS

Native apps are applications that are made by the device manufacturer specifically for the device they're being used on. iTunes, iMessage, and iBooks are examples of native apps made by Apple for use on the iPhone. iPad etc. These apps are often considered to be the fastest and most reliable to use as they make use of the device features and user experience.

CROSS PLATFORM APPS

Cross Platform apps are made in such a way they can work across different devices, which means they're more flexible in where they're used. There are two kinds of cross platform apps:

Hybrid Cross Platform – These are built with programming languages such as Javascript, HTML 5 and CSS and then packaged as a native app. The look and feel of the app will be very similar to a native app that a user would be unlikely to notice the difference.

Native Cross Platform – These are similar to the Hybrid approach but remove HTML and CSS from the process and allow the packaged app to talk directly to the mobile Operating System. The apps can make use of the device user interface controls and can make development easier as this will enable consistency between devices.

CONSIDERATIONS

The frameworks mentioned above have their pros and cons, so it's worth considering your needs specifically and thinking about what might suit you. Some factors to take into account could be the speed of the app, the support for certain features, whether or not any of the frameworks carry particular risks, and how much it costs to develop with any of these frameworks.

SHOULD I CHARGE CUSTOMERS FOR MY APP?/ HOW MUCH SHOULD APPS COST?

Considering whether or not you should charge for your app can be tricky. There are a couple of factors to consider here first such as how the app platform may affect any profitability, the industry your app is in and how your chosen audience may interact with your app. It's worth looking into how other apps have been priced and what considerations were made.

If you do decide to charge customers, here are a few options to consider:

- **Advertising** – Displaying third party ads can generate revenue via clicks, views or conversions but it should be noted that ads mustn't be intrusive to the user's experience. There are a range of ad options from video and banner ads, to native and interstitial ads. Each with their own pros and cons.
- **Freemium** – This allows the user to try out the basic elements of the app for free, with the option of paying for more content later on. It works as a good taster to an app.
- **In-app purchases** – This allows the user to pay for certain content or products within the app.
- **Subscriptions** – This method is already in use in some of the most popular apps out there such as Netflix and Spotify. By paying a small monthly sum each month, the user has access to plentiful content. It's important to make sure that content is kept fresh and interesting so that users feel they have a reason to stick around month after month.

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WHAT ARE THE ONGOING CONSIDERATIONS FOR AN APP? (WILL IT COST MONEY TO MAINTAIN)

If you're wanting to maintain your audience, it's important to keep the app up to date. That could be anything from maintaining and updating content, to exploring improving or adding features to the app. This will invariably cost money to do, but is generally considered worth it to keep your target audience interested. A lot of the time, an app can open to huge interest, which then drops off after a while as there's nothing to keep the user interested long term.

- **Make a plan** – Having a content strategy will enable you to plan ahead and keep the content fresh for your users, therefore keeping them interested in the long term
- **Improve features** – If you have features to improve on the current app experience, put budget aside to implement these
- **General updates** – As technology moves along at a pace, it's important to consider how this might affect your app. Make sure it is up to date and able to handle new devices that come onto the market every so often
- **Consider security and data handling** – Make sure your security arrangements are set up correctly and remain up to date to ensure customer data is safe from any hacks or security breaches.

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HOW SHOULD I PROMOTE MY APP?

When you've decided what kind of app you want to make, and how you want to do it, you'll need to think of how you want to promote it. There are many ways in which to promote an app:

WEBSITE

An obvious one but your website should be one of the first places to put information about your app on. This could be anything from a panel on the home page with a description and a link to whatever stores it may be in, to a page dedicated to what your app is about and why it would be a benefit for someone to download.

SOCIAL MEDIA

Promotion for your app would be easy to carry out across your social media channels, from posting on Facebook, Twitter and LinkedIn so your audience can find out more about this app. If you have an Instagram account, posts detailing your app and a link in the bio can work, and you can also link to it in the Stories feature.

With these platforms, you can also invest in sponsored posts to help get the word out quicker. It's worth putting a little budget aside to accommodate this.

PRESS RELEASE

You can send out information about your app to industry specific publications and sites, which can help widen the scope for who sees your app. It may also be worth your while letting people test the app and write up a review to share.

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APPLE/ANDROID STORES

This may seem like a daunting one as there are so many apps on the stores today but you can carry out something called App Store Optimisation, by ensuring the following:

- Your app name is unique and stands out
- Include keywords so it's easy to find
- Describing your app clearly and keeping that information up to date
- Including a few screenshots or video footage so potential customers can get a sneak peek into how the app works
- Make sure your app functions smoothly and users enjoy the experience. That way, positive ratings should be easy to get and therefore boost the visibility of your app.

SEARCH ADS

Apple introduced Search Ads, which is basically paid advertisement within the App Store. This means you can bid for relevant keywords so that when a user is searching for apps using a particular term, your app appears first.

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