SNAPPER

SECURITY

ADAPTABILITY

INTEGRATION

DEVICES

PLANNING

UX/UI

DESIGN

CUSTOMERS

COST

App rating
★★★★★

From idea to operation: investing in your own mobile app

So you think you need a mobile app – where should you start? What does the technical speak mean in layman's terms?

What are the main components you should focus on?

What will it cost and how long will it take?

Who should develop the app?

So you think you need a mobile app – where should you start?

"Over 5 million mobile apps now available to enhance our day-to-day lives"

"You know, there's an app for that" is a phrase we hear so often in this technology-driven age, and there's a great deal of truth in it. With over 5 million mobile apps now available to enhance our day-to-day lives, whatever predicament you face, there will generally be a mobile app to help solve your problem.

The transport industry is no different. With many operators now opting to add mobile to their offering, we're seeing the customer experience in public transport made much easier. If you're in the public transport industry and don't currently have a mobile app, chances are you've already identified that you need to move with the times. In this white paper, we'll look at the factors determining the complexity and cost of your app, as well as the best way to approach app development.

We live in a mobile-driven world – consumers have come to expect, rather than simply appreciate, the ability to organise their lives at their fingertips. Our whitepaper on why you need a mobile strategy takes an in-depth look at the transport industry's specific needs for mobile solutions to support their customers.

However, once you've identified that an app is the right solution, the question is usually: what will it cost? Followed by: how long will it take? With so many options and so much jargon, it can feel like just too hard a project to tackle. But mobile app development needn't be hard if you know the basics and how to approach the project to get the best possible results. How do you decide which path to take, who to contract to develop your app, and where to start in the design process? This whitepaper will address these questions and outline a framework for embarking on your app development journey.

Start at the end and work backwards

It sounds odd, but let's look at it a different way: when you read a map, you first locate your desired destination on the map. This is the logical way to navigate, because you can't get from A to B without first knowing where B is.

1. Establish your end goal

You need to set clear goals – maybe to increase revenue, grow your market share in a competitive environment, increase your customer satisfaction levels, or all of the above. For example, when ride sharing company Uber was launched, it re-shaped the taxi industry with its easy-to-use mobile app: customers could book and pay via the app whilst also receiving real-time updates on the scheduled arrival of their ride. To remain competitive, taxi companies have had to invest in similar technology to ensure they are meeting customer expectations, expectations that have changed since a more convenient alternative entered the market. In this case, for the taxi companies, their problem is that they are losing customers to ride-sharing companies like Uber – the goal for the taxi companies is to regain market share and the challenge is to remain competitive against threats entering the industry.

In 2011 , Berlin's public transport system was facing the challenge of meeting key performance indicators, with a declining source of government funding. They needed to increase revenue to get back in the black by 2016. However, with a large proportion of residents falling into a lower income bracket, increasing ticket prices was not an option – instead they needed to get more passengers using the service. Research showed that citizens found the system confusing and obtaining tickets to be hard. After identifying the main barriers discouraging citizens from using public transport, BVG set to work developing the Fahrinfo app, which gave passengers access to all the tools they needed to get around the city on public transport. A journey planner assisted passengers in planning their travel and the app allowed them to purchase tickets instantly from their phone. By removing these barriers, the app encouraged passengers to use public transport and helped BVG get back in the black, without drastically raising ticket prices.
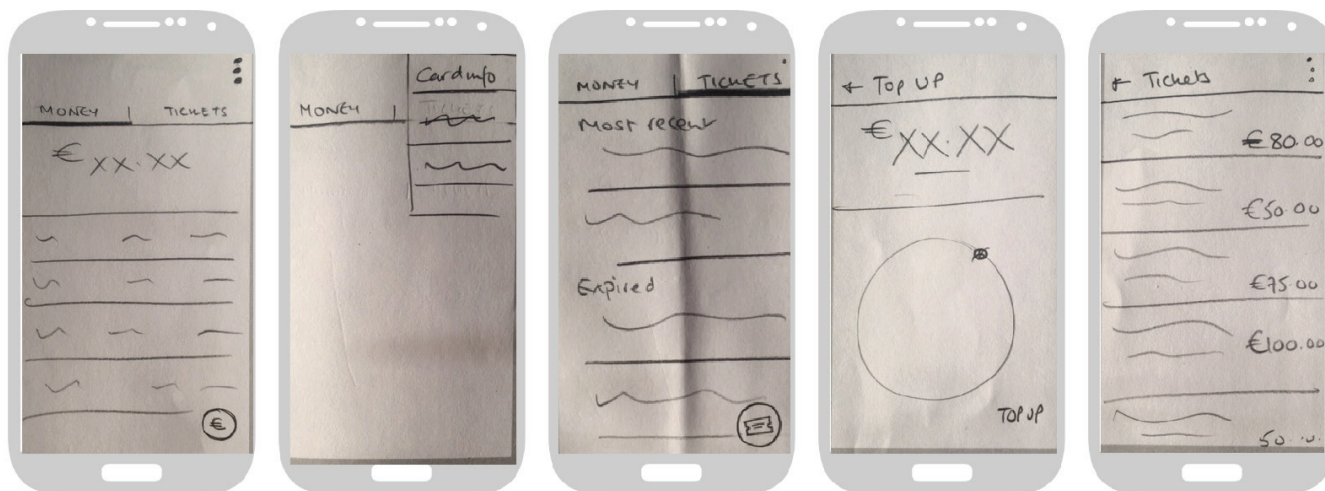
NOTES	NOTES	NOTES	NOTES	NOTES
Overview screen Home screen	Card info	Ticket info	Top up	Buy a ticket

2. Weigh up your options

Having determined your end goal, you can take a step back and better identify what is currently preventing you from reaching it: define the problem(s) you are facing as a business and your key business requirements, so that you can make an informed decision as to whether or not investing in a mobile app is the right solution for you.

3. Talk to your customers

Using customer feedback as a guide, you can identify your customer's key needs and therefore the problems that the app aims to solve, which will guide your priorities when defining the fundamental features of your app. It's critical however, not to assume to know what your market wants. A valuable source of customer feedback is your customer service channels. This may include phone lines, email contact or comments via social media. Talk directly to your customer as well.

4. Start working towards your goal

Once you've been through the above three steps, and you've determined that investing in a mobile app is the right direction for your company, it's time to start developing. Throughout the development process, one of the keys to success is to consistently refer back to your main goal, your customer's and your business's needs, ensuring that these are the focus for your end product.

At this point, a great way to make sure you keep a clear idea of where you're headed is to create a map of the main screens your app will need – these screen mock-ups will form the foundation for designing your user interface. You can create this using a mock-up tool which will give you a clear picture and brief to take to your potential developer.

What are the main components you should focus on?

> **"While 79% of users will give an app a second chance after it failed to impress them on the first go, that number plummets to just 16% that will go back for a third attempt*."**

When embarking on your technical journey into mobile app development, it pays to know a bit about the fundamental aspects that will be the main focus of the different development phases. These are the aspects of your app that will generally require the most focus and have the greatest impact on time and cost, depending on the level of complexity.

When investigating app development options, there are several factors to take into consideration that will influence the complexity of the development, and will determine whether or not you will need to develop the app from scratch or if there something out there already that's fit for purpose.

1. UX/UI – your "shop window"

The user interface (UI) is what your customers see when they are using the app and the user experience (UX) is the overall level of satisfaction that your customers experience when using the app's functionality. Your customers aren't interested in what happens behind the scenes, they only want to know how the app works from their perspective.

Your user interface (UI – essentially how your app looks) must be intuitive enough to be quickly understood by your wider customer base. Similar to a physical retail store, a customer's first impression may be negative if the shop is messy or items are hard to find. Your user experience (UX – how your app flows and works through its tasks) must

be simple, obvious and logical. If the app is too hard to use, what seemed like a great idea to boost your business can quickly turn negative if frustration causes the user to abandon the app and/or leave a negative review. Once a user leaves your app out of frustration, it's hard to get them back. On average, only 16% of people are prepared to try an app more than twice.

Some of the main reasons that apps fail are:

- Continued performance issues; freezing, crashing, slow to respond
- Long load times between screens
- Bugs/unexpected behaviour
- A long or complex registration process
- Difficult to locate key features
- Difficult to locate operational functions i.e.; buttons
- Heavy battery usage
- Heavy data usage

Undergoing comprehensive beta testing before your app officially goes to market will help to identify customer pain points and frustrations and give you the chance to make changes.
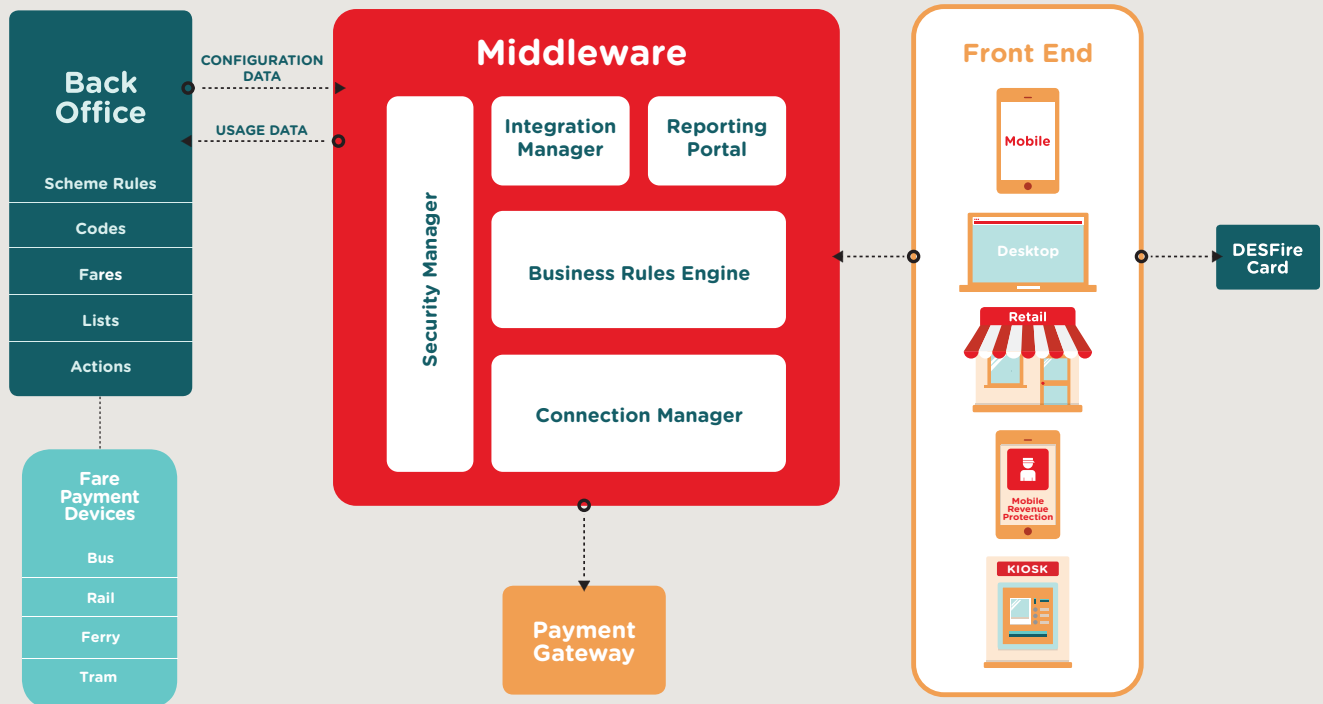
2. Integration/backend – the mediator between new and existing technology

Unless you're just starting out as a business, you will likely have existing systems and processes in place. If you're an enterprise sized organisation, these are often billion dollar systems with substantial years remaining in their lifespan. Replacing these systems to accommodate an app is just not feasible. This is why app developers will often opt to integrate the app into an existing system, building a back-end structure that's designed to pull and send information between the app and an existing system.

Organisations often operate under the assumption that their existing systems will not support a mobile app and therefore endure the dissatisfaction of their customers. However, it's well worth investigating the possibility of an app that will use modern integration and middleware solutions which allow existing systems to support a mobile app solution.

Back Office

Scheme Rules

Codes

Fares

Lists

Actions

CONFIGURATION DATA

USAGE DATA

Fare Payment Devices

Bus

Rail

Ferry

Tram

Middleware

Security Manager

Integration Manager

Reporting Portal

Business Rules Engine

Connection Manager

Front End

Mobile

Desktop

Retail

Mobile Revenue Protection

KIOSK

DESFire Card

Payment Gateway

---

3. Security – don't risk leaving your front door open

When it comes to the security in your home, simple measures will keep the majority of people out. The same goes for your technology. Basic security will keep the majority out, but it's the minority that will go to extreme lengths who are your highest risk and can do the most damage should they be able to access or corrupt important company or customer account information. In the same way that this minority will look for the unsecured window in your house, if there's a hole in your software security, they'll find that too.

As well as locking all of your windows and doors, you also need to look at how easy your app might be to replicate. From a transport perspective, this could mean passengers working out a way that they can ride to be free and avoid buying a ticket which has potential for a significant revenue drain.

Also consider the implications of a security breach through the app and into other areas of your business: if your app integrates with other systems within your organisation, the fall-out from a security breach could be catastrophic. The faster technology moves – and it is on the increase almost daily – the faster your app's encryption codes can become obsolete and easier to crack.

It's a good idea to take the time to educate yourself on current web security best practices. Organisations like OWASP (Online Web Application Security Practice) can provide valuable, real-time information about security threats and how they are best dealt with.

4. Changeability/ adaptability – keeping ahead of the tidal wave

A common misconception is that an app requiring continual updates must have something wrong with it or not have been built correctly – this is not the case. When an app is first released, it's designed to be compatible with the latest handsets, operating systems and consumer needs. Every time a new iteration of a handset is released, or an operating system is updated, mobile apps need to adapt to work with any changes. In fact, an app that releases regular updates can be considered to be more reliable than one that doesn't.
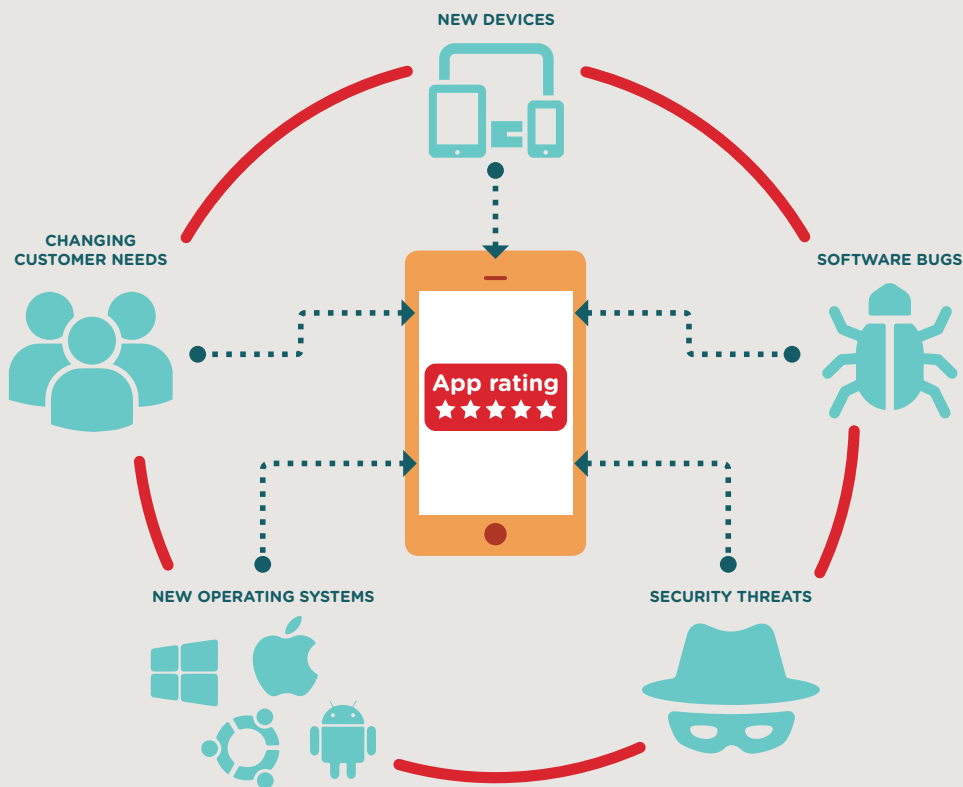
What happens when you don't lock all of your windows?

In 2011, Nissan launched its mobile app companion for the best-selling electric vehicle, the Leaf. The app allowed owners to control the car's charging remotely, access information about the battery charge level and also set the climate control before starting a journey. All was going well until February 2016 when security researcher Troy Hunt uncovered a loophole which allowed hackers access to the app and control the functions of any Leaf with only the vehicle's VIN (vehicle identification number).

News of the security issue broke and Nissan was forced to pull the app and block access to the servers used to access the information whilst it investigated and fixed the issue. A public apology was made by the car manufacturer and the app was unavailable for several months whilst the company worked to fix the security risk. Although the app was later relaunched, this did not gain anywhere as much media attention as the security issue itself.

The result is an expensive lesson in the damage that can be done, not only to a brand itself, but to the reputation of a product, particularly one in its early adoption phase.

Mobile app update circle of influence

NEW DEVICES

CHANGING
CUSTOMER NEEDS

SOFTWARE BUGS

App rating
★★★★★

NEW OPERATING SYSTEMS

SECURITY THREATS

Mobile apps also need to be able to adapt to changes in consumer behaviour, as the needs of the market evolve and change. The ability to adapt and ensure that your app is consistently performing at the desired level will help ensure that you are operating within the customer's "zone of tolerance" i.e. the difference between service that a customer considers satisfactory and service that they consider adequate.

5. Supported devices – catering for the greater population

You'll want your app to support as many devices as possible. If the technology is only available for use on a handful of handsets, your new app is going to be the source of disgruntled customers. Market research in this area can be invaluable – once you are able to ascertain which operating systems and handsets your customers

are using, you will be able to focus your resources on developing your app specifically for these handsets. You'll also need to account for how compatible your app is going to be with various features of phone models, including screen size and the technical capabilities of the handset – will the user interface of your app fit within a smaller screen and will a handset with less functionality be able to process the data your app requires?

A good source of information for this is the Google Analytics from your website, which will show you what handsets your website visitors are using as well as the operating system. There are also plenty of resources available online that provide up-to-date statistics regarding the market share of each operating system, for each country and region. Check out the Kantar World Panel market shares for each operating system.

What will it cost and how long will it take?

This isn't something that is easy to judge without seeing the full scope of the project. First off, let's look at what's generally involved in the development of an average app:

1. Planning and strategic design

This is the initial phase where your concept is taken to an expert in app development and investigated in terms of technical feasibility. The deliverable for this phase would usually be a working prototype. This phase can take from four to eight weeks.

2. Development

This phase is where the grunt work happens. Where all of the development goes on behind the scenes and where, assuming a iterative approach to app development, a minimum viable product (MVP) is the main deliverable. This phase may take from two to six months, depending on the complexity of the project.

3. Backend integration

During this phase, the development team will ascertain what is required, to link your new app with your existing systems to ensure the two communicate with each other as required. This phase will take from four to 12 weeks, again depending on the complexities involved.

4. Testing for performance and bugs

Here is where your app will undergo rigorous testing, to ensure it's ready for launch before it's released to your wider market, and that any issues are addressed so that your customers are receiving the best possible version. This will likely include market testing, using a research group called "beta testers" who will provide you with feedback on the app's performance, as well as user experience. You can form your own panel of beta testers by inviting select customers to participate. There are also beta testing programmes available via Apple and Google Play app stores which you can take advantage of. A good timeframe for this testing phase is four to 12 weeks.

5. Launch

Now it's time to take your new app to market – it will be loaded into either the Google Play Store, the Apple App Store, or both. A "soft launch" is often considered best practice, to allow time for early adopters in your customer base to download the app, to ensure that there are no issues before releasing your marketing communications to encourage uptake.

6. Ongoing maintenance

Most app developers will propose a Service Level Agreement (SLA) for an initial set period of time, where they will provide technical and often customer support for your app. This will include monitoring of the app from a technical perspective, ensuring it's always up-to-date and that new versions are released as required. It can sometimes also include receiving and analysing customer feedback, which should be fed back to you along with any recommended actions to improve the user experience.
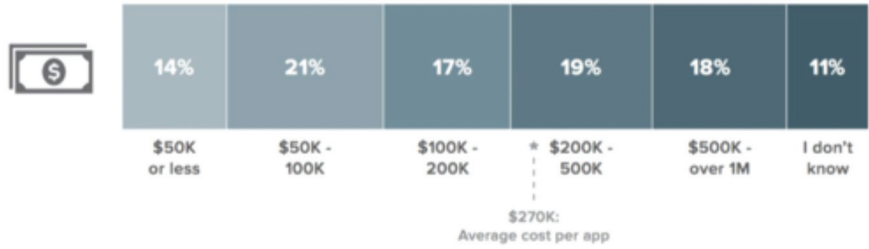
Timeframe

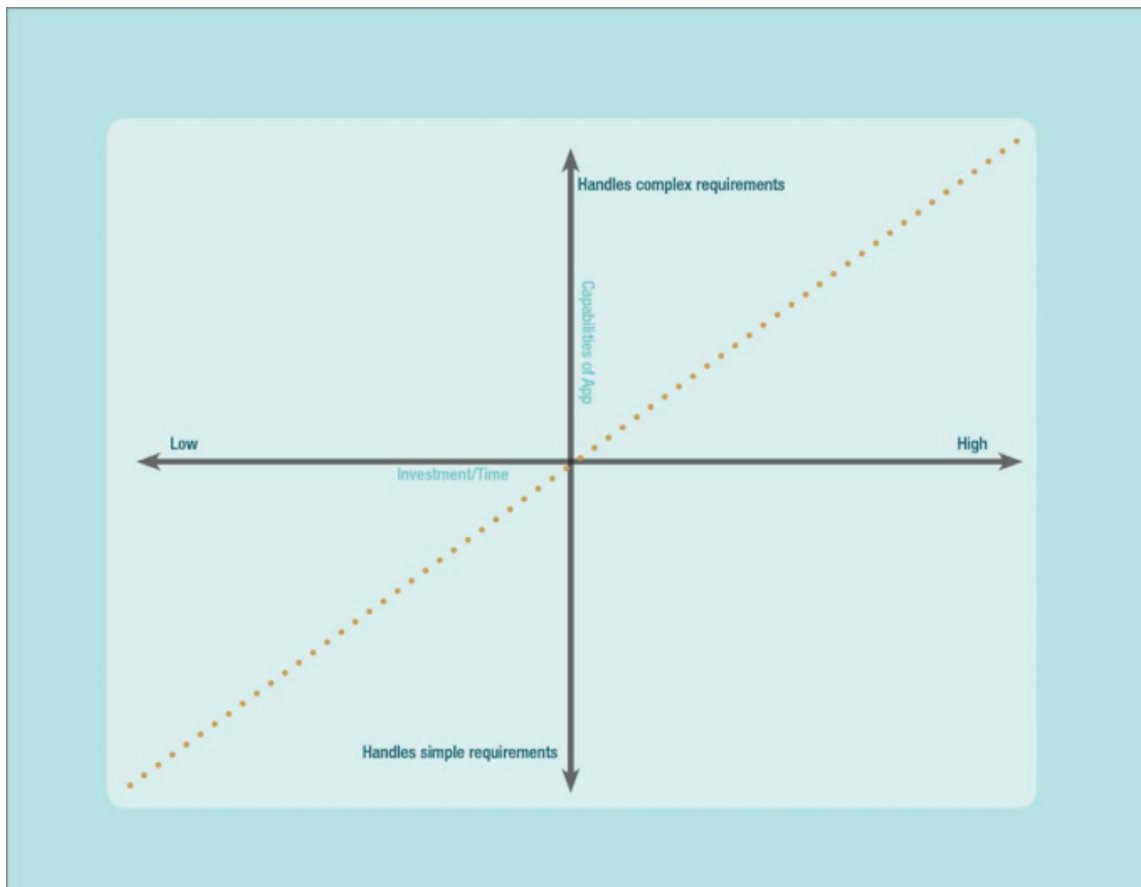|	Phase	Timeframe
1	Design and plan the user interface	4-8 weeks
2	Prototype and roadmap	4-8 weeks
3	Backend integration	12 weeks
4	Testing for performance & bugs	12 weeks
5	Launch	4 weeks
6	On-going maintenance	1-3 years

Cost

Now, let's have a look at the variables that affect the cost that you may be quoted:

- Number of screens
- Device compatibility
- 3rd Party integrations (Facebook, Google Maps, journey planners, online store, website)
- Integration with existing systems (store, parent ticketing system)
- Supporting technical requirements
- Security

HOW MUCH DOES YOUR ORGANISATION SPEND TO DEVELOP & DEPLOY ONE APP?

14%	21%	17%	19%	18%	11%
$50K or less	$50K - 100K	$100K - 200K	$200K - 500K	$500K - over 1M	I don't know

$270K:
Average cost per app

Credit image: buzinga.com.au

When investigating each variable, it's important to look at the whole picture before deciding what level of importance this will have – don't just look at the cost of development, look at the cost of doing nothing. Assess the potential pay-off as a result of the investment as well assessing the risks of inaction.

Who should develop the app?

Using a developer with experience in your industry is ideal. Look for case studies from other organisations that have already achieved what you are aiming for, find out who has developed their app and research the company. Networking at industry-related trade events is always a good find way to find the right developer for the job.

Experience is not the only credential that makes a good app developer – your relationship with your developer will continue after the initial development work is complete so it pays to look for a company that works in a way that's compatible with your own company. Look at the company's values and operational style to ensure a harmonious fit.

Key references

BVG case study http://www.masstransitmag.com/article/10813195/bvg-keeping-berlin-moving

http://www.computerworld.com/article/3037996/car-tech/nissan-apologizes-shutters-mobile-app-that-left-leaf-ev-hackable.html

http://www.digitaltrends.com/mobile/16-percent-of-mobile-userstry-out-a-buggy-app-more-than-twice/#ixzz4OiffHLKk

www.buzinga.com.au – infographic "how much does your organisation spend to develop and deploy one app?"

SNAPPER