



Progressive Web Apps: Answering All of Your Questions



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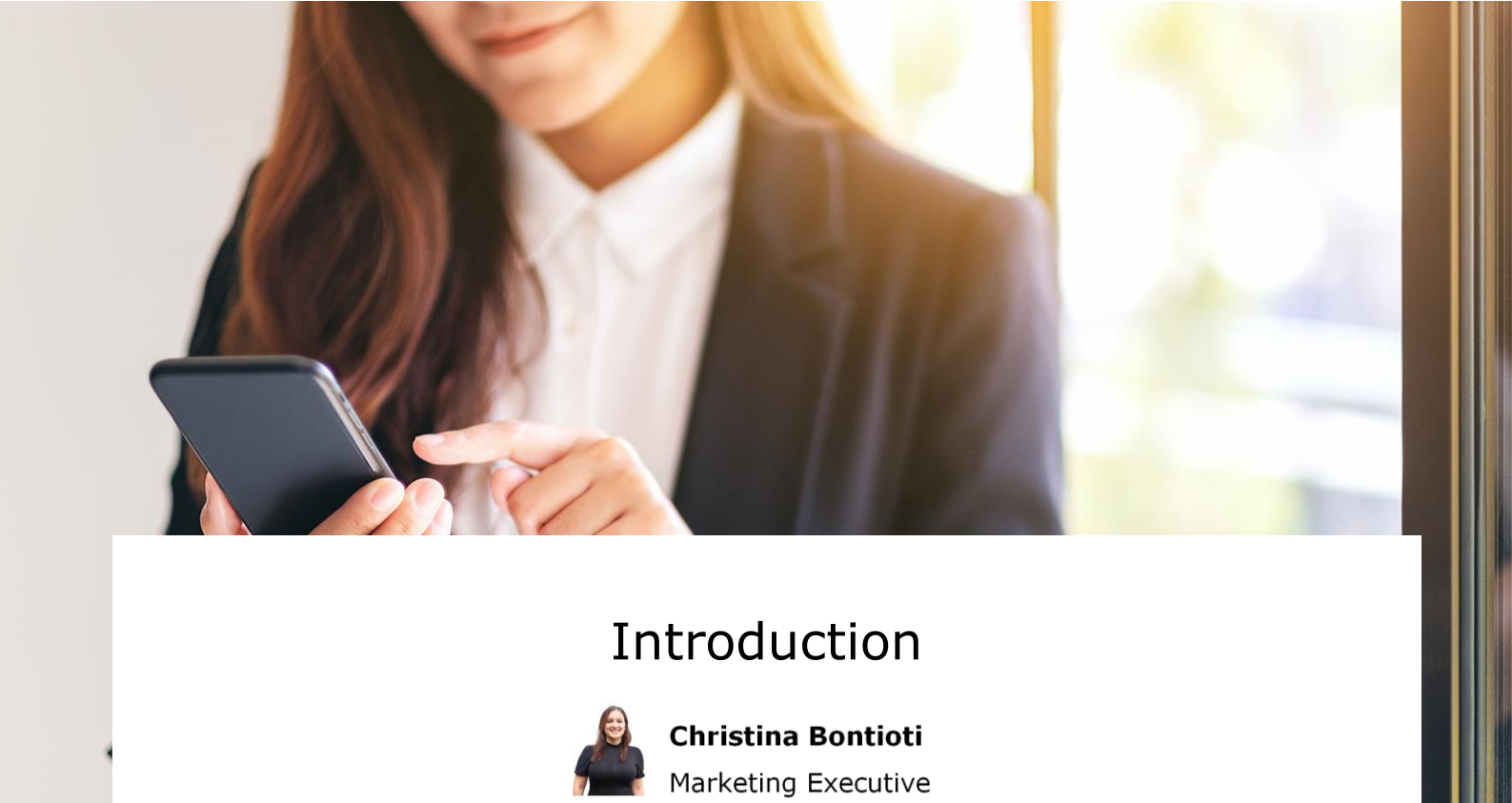
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Introduction



Christina Bontioti
Marketing Executive

“By 2020, progressive web apps will have replaced 50% of general-purpose, consumer-facing mobile apps”

Gartner Group

If you are in eCommerce, you have undoubtedly come across the term “PWA” over the past 12 months. Despite it becoming the new buzzword, there is a lot of confusion surrounding the specifics and the significance of Progressive Web Apps. We created this white paper to break down exactly what PWAs are and how **they are revolutionising eCommerce.**

After taking a brief look at the history and how PWAs came about, we will jump straight into the requirements and tangible benefits of building a PWA as well as analyse examples of PWA solutions that have already yielded considerable results for some merchants.

“[PWAs] herald a new era where fast and immersive experiences are democratized”

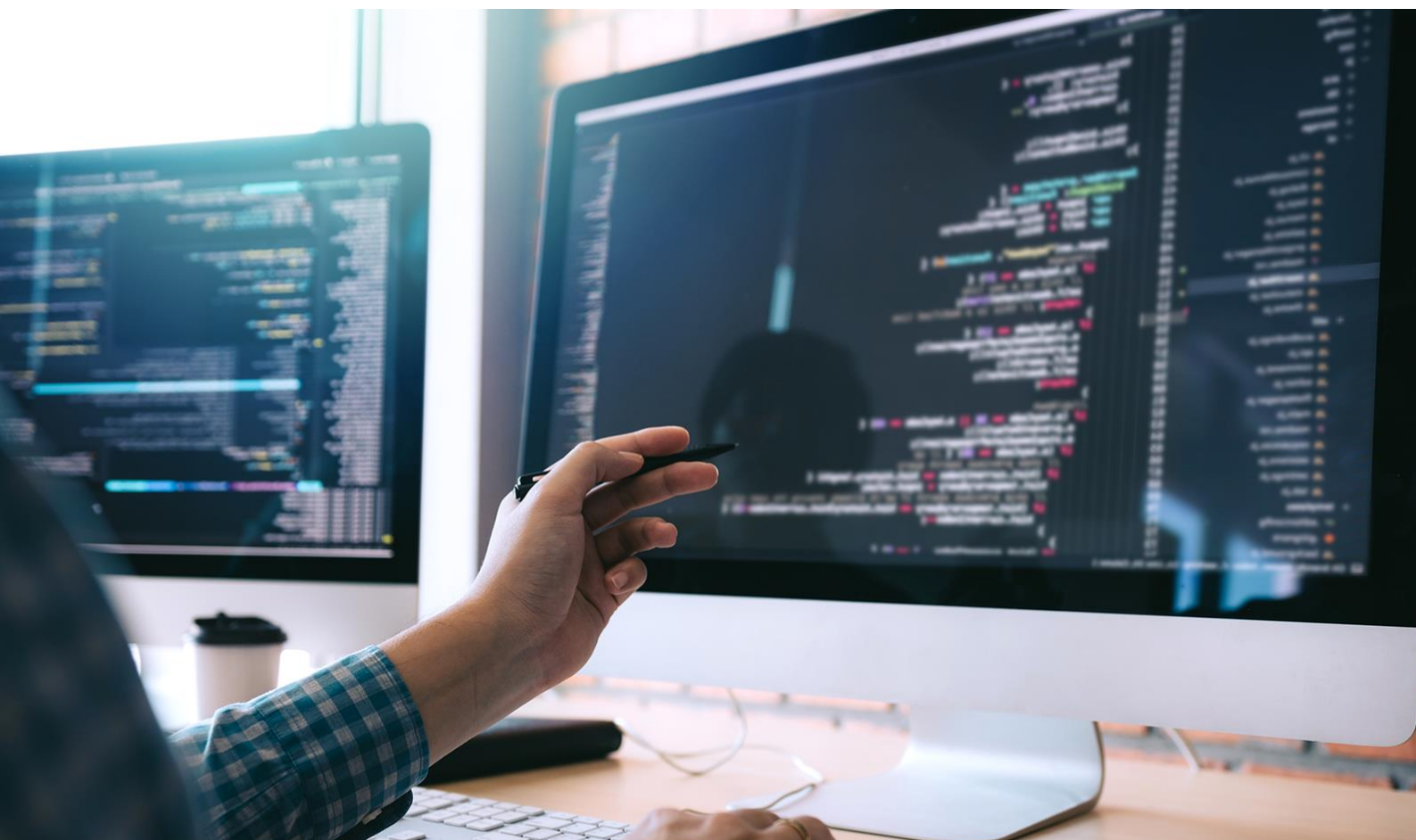
Jason Grigsby, co-founder Cloud Four and author of ‘Progressive Web Apps’

History of PWAs

About 5 years ago, two Google engineers began to notice a new type of website emerging: they lived as apps, provided better user experiences than web browsers and also managed to retain linkability. The engineers, Frances Berriman and Alex Russell, saw their revolutionary nature and knew they would have a significant impact on the internet and on eCommerce. Motivated by this realisation, they coined the term “progressive web apps”.

A standard introduced by Google, and promoted by Microsoft and Amazon, PWAs **combine the best features of browsers with the best features of native apps** and create an incomparable user experience across all devices. PWAs are “responsive, connectivity-independent, app-like, fresh, safe, discoverable, re-engageable, installable, linkable web experiences,” says Alex Russell.

Over the past 5 years, PWAs have changed characteristics and monikers several times; though not uncommon for new technologies, this has led to considerable confusion when it comes to pinning down the essence. The name may not be significant, even Berriman has said of the term “it’s just marketing”; the proposition, however, is revolutionary.



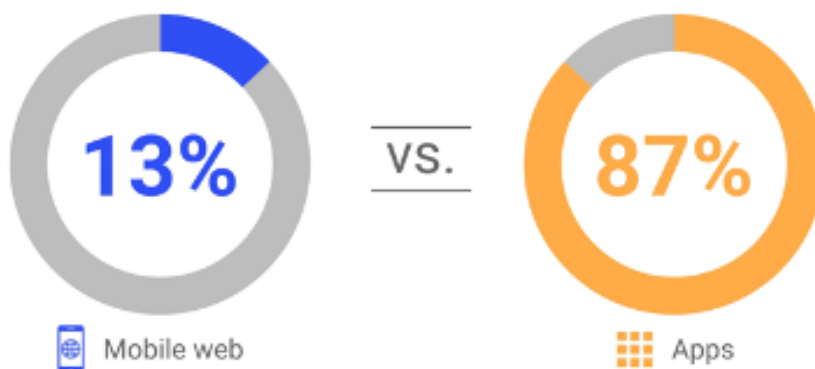
Mobile site v native app v PWA

Research indicates that website performance is critical to maintaining customer attention and completing online transactions. Specific findings (Akamai 2017) include:

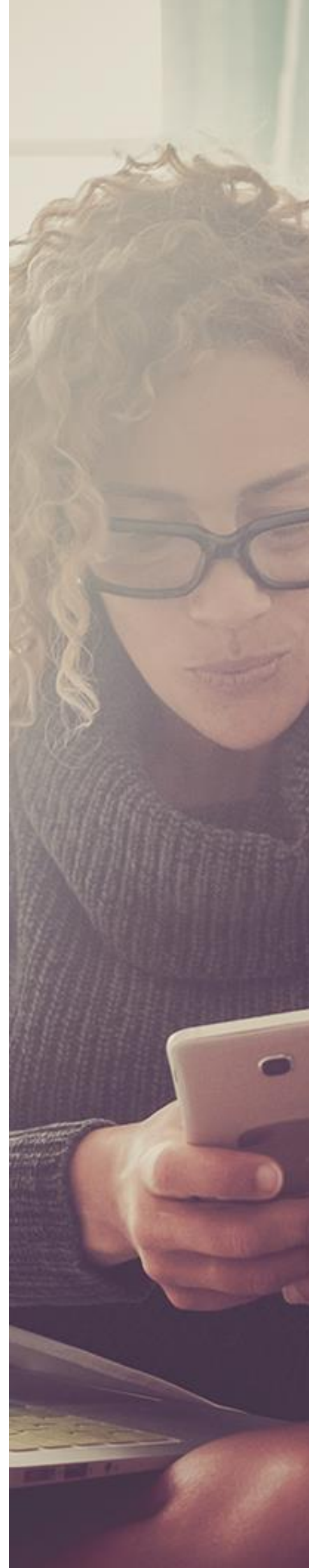
- **Half of consumers** browse for products and services on their smartphones, while only one in five complete purchases using those phones (the mobile revenue gap)
- A 0.1 sec delay in website load time can hurt conversion rates by **7 percent**
- A two-second delay in web page load time increase bounce rates by **103 percent**
- 53 percent of mobile site visitors will leave a page that takes longer than **three seconds** to load
- **Bounce rates** were highest for mobile phone shoppers, while tablet shoppers had the lowest bounce rate

While mobile websites are an option for retailers, historically native apps have been the answer for merchants who want to create smooth user-experiences for customers on mobile. Native apps tend to perform well, be quick and have a better UX than responsive websites on mobile.

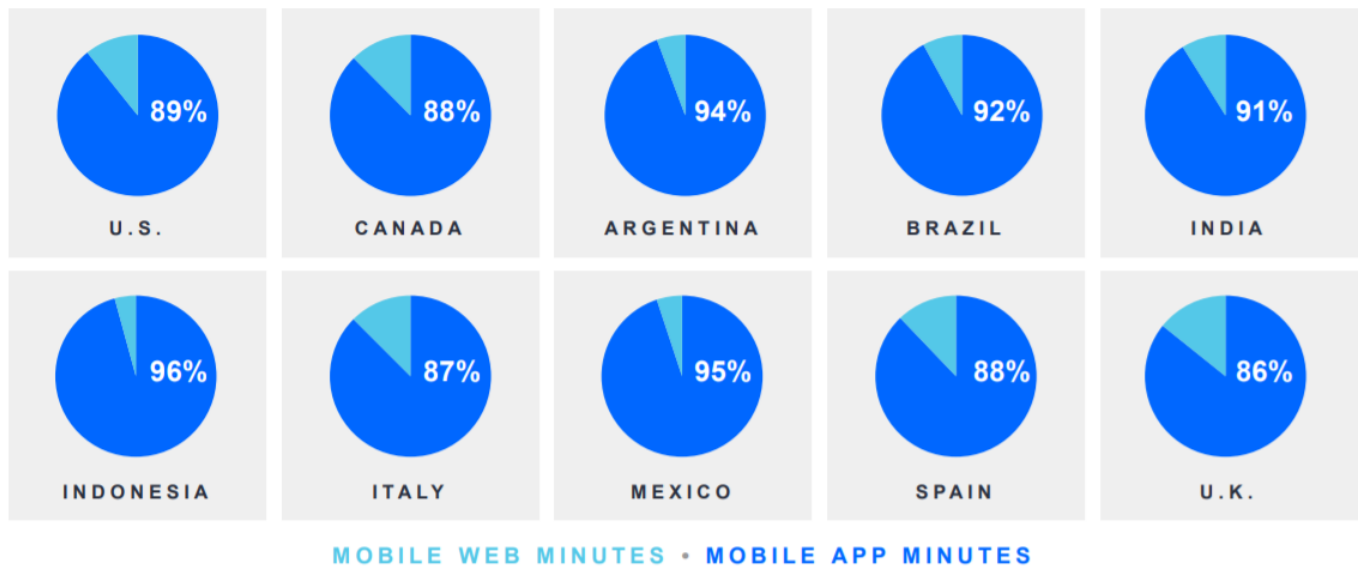
Partly because apps reside on users' home screens, time spent on mobile apps far exceeds time spent on mobile websites:



Source: comScore mobile Metrix, U S., Age 18+, June 2017



Apps drive the majority of mobile minutes in all markets:

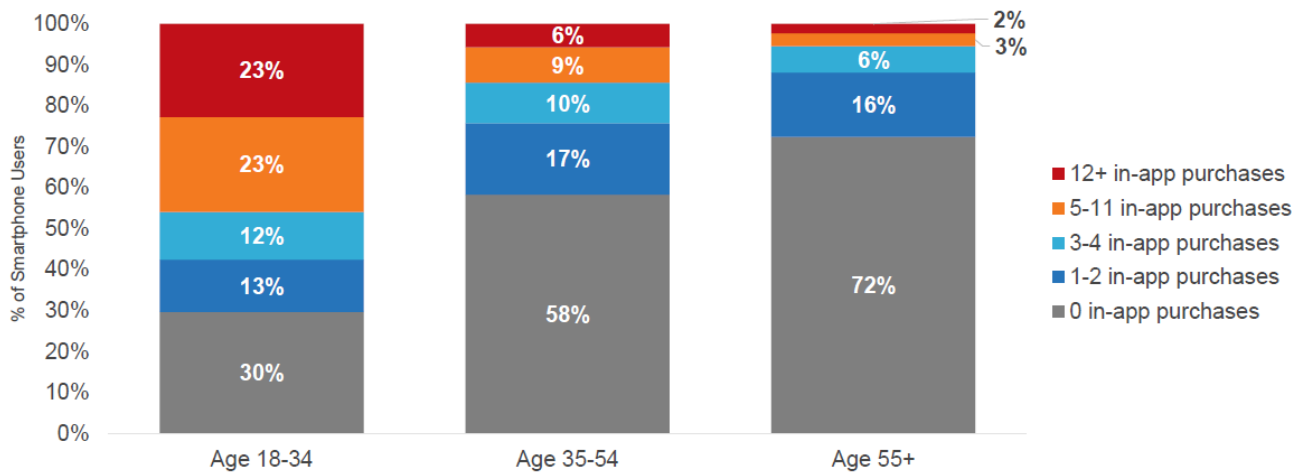


Source: Comscore Mobile Metrix®, Mobile web vs mobile app, Total minutes, Standard audience sets, June 2019

They are also more conducive to spending:

In-App Purchases in the Past Year by Age Segment

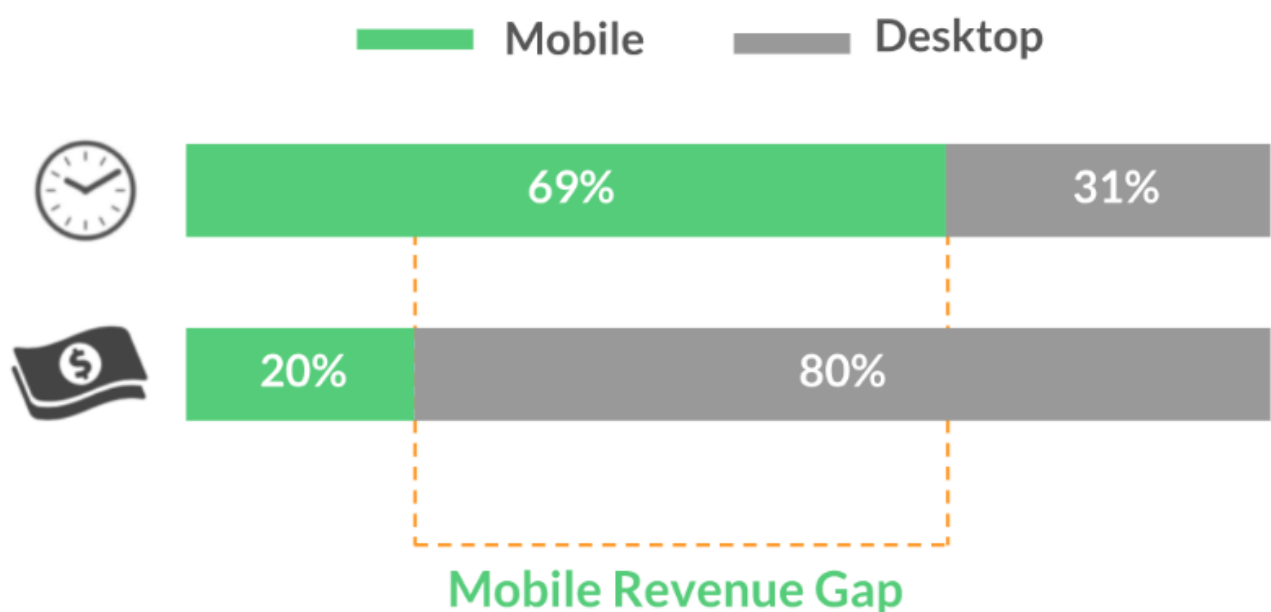
Source: comScore Custom Survey, U.S., Age 18+, 2017 Wave



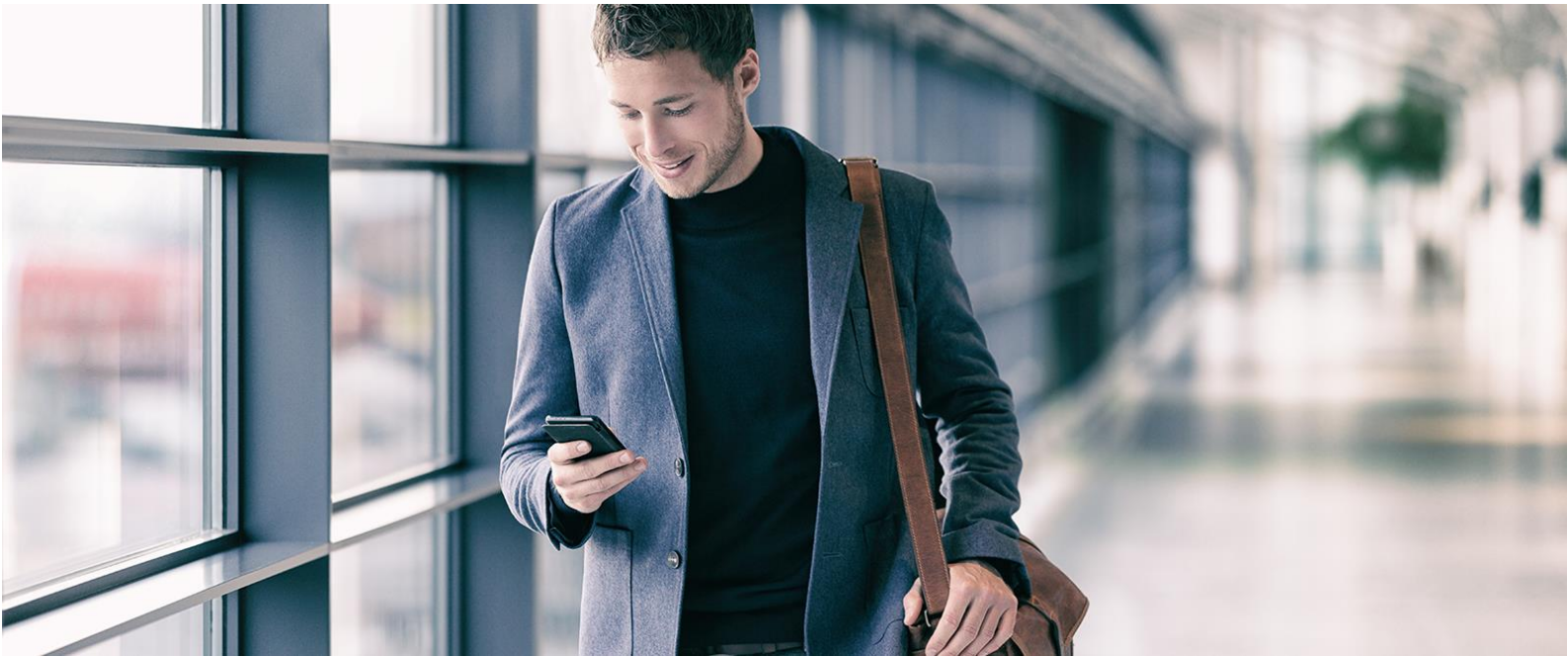
While they can definitely prove valuable for some merchants, native apps can require a large initial investment, both in time and money, to create and maintain. The main issues with native apps are:

- If a business wants to have an app for android as well as iOS, that essentially requires them to build for and manage **several apps** for different types of devices.
- In order to build and maintain apps for more than 1 device, a business requires a larger team and **bigger budgets**, making this an expensive investment.
- Apps need to be uploaded to and approved by **app stores**.
- Even after putting all the work in to building apps, they require a considerable **buy-in** from users to download and update them, not to mention the valuable space they take up on their phones.

NB: PWAs are not always a replacement for native apps. In cases where native apps are currently serving their purpose, there is no need to scrap them. However, there are countless underperforming apps, unresponsive websites and a mobile revenue gap that does not seem to be shrinking.



Source: Medium, Optimizing Mobile eCommerce — PWA and CRO, 2019



So, how can you create uniform and smooth experiences for your customers without breaking the bank? **This is where PWAs come in.**

PWAs combat this by providing an app-like experience for users while being delivered through the web. They feel smooth and intuitive to use while being easy to access regardless of device and connectivity – **you build once and it works everywhere**, including desktop devices and tablets. This means that merchants need only maintain and update one platform for selling online.

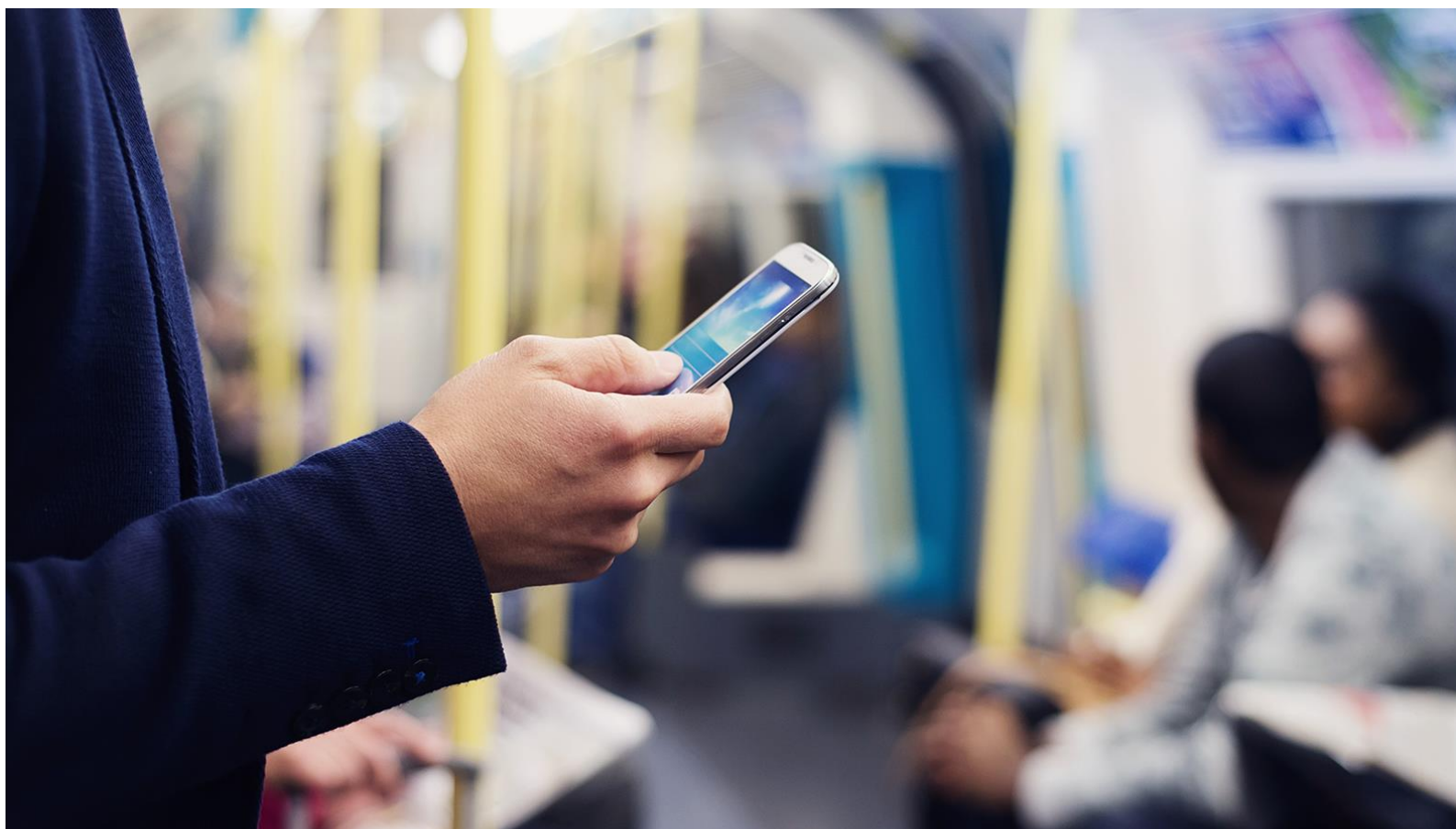


PWAs have always been motivated by the **user experience first**. This means that if you use all the same Responsive Web Design principles as you would for a mobile app, such as optimised thumb reach and TTI (time to interaction) to name only a couple, your PWA can provide an incredibly smooth user experience. This in turn can have a substantial impact on both customer behaviour and your business as a whole.



In fact, Google uses the acronym F.I.R.E. to reflect the effectiveness of PWAs:

- **Fast:** Both in actual and perceived performance, PWAs are quick to respond
- **Integrated:** Consistent and self-contained UI
- **Reliable:** Work well offline
- **Engaging:** Better UX, ability to be saved on home screen and used as apps



Best practice PWA features

According to Berriman and Russell, to provide such benefits a PWA should aspire to as many of the following characteristics as possible:

- **Responsive:** No matter the device or screen size
- **Connectivity-independent:** Large portions of website function offline or on poor connections
- **App-like:** Native feel, fluid and fast (cached app-shell)
- **Fresh:** App gets updated behind the scenes so always stays current
- **Safe:** All traffic is encrypted
- **Discoverable:** Using a manifest, they can be found by search engines and browsers
- **Re-engageable:** Push notifications and alerts
- **Installable:** Can be added as an app to a device home screen
- **Linkable:** Can be shared and accessed without need for downloading

Bonus

Built using progressive enhancement: although they have a baseline experience that works across platforms and devices, it has the **ability to enhance that** experience on more capable devices.

Take note that this list is neither compulsory nor exhaustive. It should be used as a guide and taken into consideration alongside the requirements that are **specific to your business**.



Examples of successful PWAs



ASDA's George.com increased conversion rate by 31% and had 2x lower bounce rate. West Elm's PWA implementation earned a 15% increase in time spent and a 9% lift in revenue.



Flipkart, India's largest eCommerce site, tripled time spent on the site and drove 40% higher reengagement.



AliExpress, part of the massive Chinese platform Alibaba, saw conversion rates for new users increase by 104%.



Alibaba's PWA quadrupled the company's user engagement and increased conversions on mobile web by 76%



Once Pinterest replaced their native app and website with a PWA, they saw core engagement increase by 60%, user-generated ad revenue increase by 44%.



Lancôme saw an 84% decrease in time until the page is interactive, leading to a 17% increase in conversions and a 53% increase in mobile sessions on iOS with their PWA.

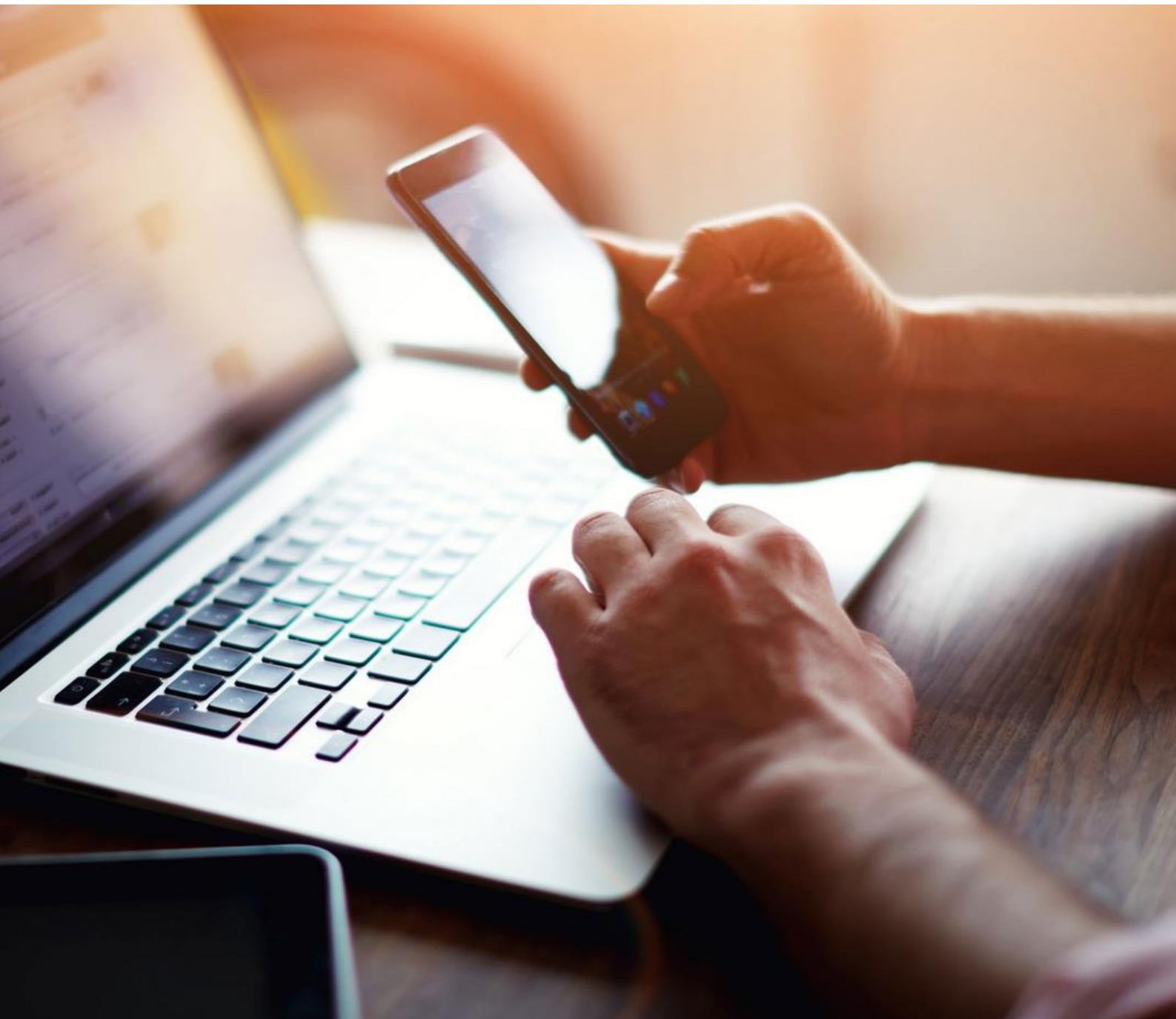
DEBENHAM'S

Debenham's digital product management team reported double-figure growth in conversions and a customer journey time reduced by 50%.



Trivago saw engagement for users who add to home screen increase by 150%, a 97% increase in click outs to hotel offers for users of the PWA and, among users whose sessions were interrupted by a period offline, 67% come back online to continue browsing the site.

Source: PWASTATS.COM



Benefits to merchants

With the right combination of features, PWAs can benefit your business because they:

- Are **multi-platform** and multi-browser: you will only need to write the code once and it will be available across devices and browsers.
- Can be stored on **home screen** and send **push notifications**, like an app.
- Are cheaper to maintain than an app and only need to be **updated once** for changes to be applied (no updates required).
- Offer an **offline-first** approach allowing users can keep on browsing even without an internet connection, increasing engagement.
- Use **headless** architecture and can be added to any eCommerce platform by API relatively fast.
- Have a loading time of at least **2-3x faster** compared to responsive or m.dot web stores. They work on-demand and are **always accessible**, without taking up a smartphone's valuable memory or data.
- Have **reduced server load** and increased efficiency.
- Have **seamless browsing** which can lead to an increase in conversion rates. In the case of Petlove, a PWA implementation resulted in a 2.8x increase in conversion and a 2.8x increase in time spent on site.
- Are **80-90% lighter** than an app. Starbucks' PWA clocked in at 233 KB, 99.84% smaller than its iOS app.
- Exist on the web just like any other website so are **easily found by search engines** and through social shares whilst also ranking higher according to mobile-first indexing.
- Require **less buy-in** than native apps (need to be downloaded through app stores) and decrease the cost of user acquisition (CAC) as they can be downloaded directly from your site.

The moral of the story? You can pick the features that you need and create a PWA that is unique to your business requirements because you can be sure that it will help you grow.

B2B and PWAs

PWAs are not only suitable for B2C businesses - there are specific PWA functionalities that are in fact perfectly suited for B2B businesses. These are:

- **Connectivity-independent:** As most B2B customers are returning and repeating purchases, PWAs' ability to cache pages after the first visit will be a huge asset to these customers. Regardless of connectivity, they will be able to see the pages they visit and place the orders they need.
- **Payments:** Although all payments require connectivity to go through, with B2B trade credits and invoicing, it is possible to place and process orders on PWAs even if the payment does not immediately go through. This can prevent conversions from falling as the customer completes the purchase without any issue, even if connectivity is disrupted.
- **Scanning:** PWAs have the ability to act as barcode scanners without further implementation or costs.
- **Maintenance:** Apart from being able to implement one PWA and essentially have an app (not requiring extra work), developers who work on and maintain native apps will likely cost more to hire in the long run, as demand drops and they fall in numbers. PWAs are built on JavaScript, which is widespread and in demand, especially as PWAs become more prevalent in eCommerce.



SEO benefits of PWAs

A PWA could also boost your website's SEO dramatically thanks to the below functionality:

- **Crawlability:** One major advantage PWAs have over native apps is their inherent crawlability. Since PWAs are just websites, this means that Google and other search bots can index and crawl them as websites and affect their visibility and rankings. By implementing a URL structure using traditional SEO rules, PWAs can be indexed by Googlebot like any other website.
- **Site speed:** Due to caching and connectivity-independence, you can satisfy both your customers and Google by having a quick and reactive website. Forbes saw a massive speed improvement once they switched to PWAs, reducing their mobile load speed from 3–12 seconds, all the way down to 0.8 seconds.
- **UX:** PWAs are responsive, navigable and allow push notifications – 3 crucial features for a good UX which in turn leads to longer session durations, lower bounce rates and more engagement – all of which help with your rankings on Google.
- **Engagement:** No download to be on home screen: Less storage, less buy-in, automatically updated by company rather than the end-user. Once on the home screen, the chances of engagement increase even more with push notifications.

This was experienced by Forbes magazine when they launched their own PWA. Users were notified every time new content was available via push notifications. With very fast page load times, quick transitions and a light page design, Forbes' PWA managed to achieve the following:

- Increase scroll depth by 3x
- Improve sessions per user by 43%
- Get a 6x increase in readers completing articles
- Double their engagement rate which means a 100% increase in engagement

To conclude, if you have a PWA and:

- tend to on-site SEO
- make sure your PWA is responsive to all screen sizes and devices
- update as necessary
- maintain high loading speeds

then you are putting your **customers and their experience first**. This will undoubtedly lead to happier customers in the long-term and to an uplift in your organic search traffic. Win, win.

	Native App	Responsive Website	Progressive Web App
Functions Offline	✓	✗	✓
Push Notifications	✓	✗	✓
Installable on home screen	✓	✗	✓
Full screen experience	✓	✗	✓
Indexable by search engines	✗	✓	✓
One place to enter content	✗	✓	✓
Works across all devices	✗	✓	✓
No download required	✗	✓	✓
Doesn't require updates	✗	✓	✓

Source: Simicart, 12 Best Examples of Progressive Web Apps (PWAs) in 2020, 2020



Challenges

While they have many advantages, PWAs come with their own challenges. Being aware of these can help you make sure that you are deploying this great eCommerce strategy correctly.

Below are some of the challenges you should consider:

Limited data storage

For example, currently on iOS, a PWA can only store up to 50 mb of data for offline access. And, if the user does not launch the app for a few weeks, the cached files will be deleted, requiring a full download on next launch.

Limited access to some features

No Siri Integration. Even if you have a PWA installed with an icon and the name Tinder, Siri cannot find it. In addition, push notifications are currently not supported on iOS, although coming soon. Access to certain hardware features like Bluetooth, Touch and Face ID are limited or not yet available.

PWAs are slower on first visit

From a business perspective, it is a good idea to convince customers to pin a PWA to their home screen on mobile devices. There is even a default method for doing so in the PWA standard. However, whilst installing a PWA is much faster than installing a native app, the obstacle comes with the first run of a PWA. While a native app is installed separately and the first visit is smooth, the fact that PWAs are installed on the first visit of the user means that at this one moment, a PWA can be slower than a native app.

PWAs use storage too

Users do not like to install apps because they are afraid of the disk-space used by the apps. With a PWA, this looks different for two reasons. Firstly, PWAs are much lighter. Secondly, users do not see the typical installation process. They just click on a dedicated button in the browser, or on the web page, and the shortcut is created on the home screen. Of course, when the PWA is first loading, all the content is downloaded so it will use some storage on the mobile device. In the long run, users can be negatively surprised that PWA, even if much lighter, also steal precious space from their smartphones.

There is no marketplace model for PWAs

The next important issue here is the marketplace model v. open installation. For sure, it is great that installation with PWA is super-easy but, without a marketplace model, the user is fully responsible for their safety when he is installing the app. What's more, with a lower entry point, we can anticipate a higher number of apps from suspicious sources. So, from a safety point of view, we need to educate users to install PWA only from safe, secure and trusted sources. This is partially done by Google by encouraging website owners to use HTTPS.

That said, as the uptake of PWAs continues to grow exponentially, we are confident that these limitations will be addressed in the near future.



Conclusion

So, if you're looking to improve the user experience for your mobile visitors, or you struggle with major issues like a long loading time or low conversion rates, definitely take a look at Progressive Web Apps.

Since PWAs represent the best practices for the web, it makes sense and we recommend that if you are planning a new website, it should be a PWA. To take it even further, if your website makes your business money, you NEED a PWA as it can have a significant impact on your revenue. Once again, that does not necessarily mean adopting every feature associated with PWAs; your organisational needs may require your website to only have certain basics – and that's fine. The bottom line is that you should start considering which PWA features your business could benefit from and start seeing increases in conversion, user engagement and sales.

There is no doubt in our mind that PWAs are the way of the future so if you want to stay ahead of your competition, start planning your PWA site now. Don't let the jargon and confusion around the definition and capabilities put you off – talk to an expert like Screen Pages who can advise you on the best PWA platform for your needs and **start seeing the benefits.**



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