

To mobile web app or not to mobile web app?

By David Rolnitzky, Summer 2010

Introduction

This document explores some of the issues, technologies, and trends that you might consider if you are debating whether or not to create a native or mobile web application to support your ecommerce service. It's not intended to be a comprehensive guide but rather to provide a starting point for discussion. Not every single aspect of the mobile web is addressed, and some of the considerations here may not be relevant to you. However, I attempt to provide a good overview of some of the main issues to think about when considering a mobile application. The accompanying worksheet provided may help organizations considering whether or not to move forward with a mobile app.

First, a few definitions. In this paper, I refer to a mobile web application and a native application as follows:

web application: designed to run within a browser using open standards (html, css, javascript) for an “application” like experience over the web.

native application an application *installed* and run on a particular mobile device, typically a smartphone like the iPhone, and designed to take advantage of a particular operating system and hardware.

Though the line between a mobile web application and an optimized mobile website continues to blur, I consider a mobile web app to be dynamic: that is, it can establish a unique one-to-one relationship with a user and allow them to create or manipulate data, something not possible on a static content website. For example, I consider ecommerce websites to be web applications because of dynamic data exchange (e.g. placing an item in a cart) and providing a one-to-one environment (e.g. receiving recommendations). Similar to a web application, a native application delivers a dynamic user experience.

First Considerations

There are a few questions you might consider before choosing to move forward with mobile development:

What is the behavior of your current customers for accessing your company's website?

Are they accessing it via a mobile web browser or primarily through a desktop browser? Take a look at your web analytics. If a significant percentage of your users are interacting with your website while on-the-move, then fast-tracking mobile app

development may make sense. But even if you don't have access to this information, or your users aren't yet accessing your website from a mobile device, there still may be a number of good reasons to move forward--perhaps it'll open up a new market opportunity, match the competition, or give your brand increased visibility.

How do customers typically buy your product or service?

Think about your typical customer's behavior--and is it even typical? How do they buy? Does your customer deliberate at length before making a decision? Do they compare prices? Are they likely to buy at anytime? How about purchasing in-store vs. online? These questions will not only help determine whether or not it may be time to create a mobile application, but also will help inform some of your design decisions should you choose to move forward with development.

What is the competition doing in the mobile space? How many retail apps are available in your category?

Take a look at what's already in the mobile marketplace. What are the trends and features? Are your competitors building native applications or are they sticking with web applications--or are they even just sticking with their standard desktop web presence? I've included a brief comparative summary of some top retail applications toward the end of this paper.

How do you envision your customers, or new customers, using your mobile application?

How will the mobile application complement your current website? Beyond just finding or searching for information from afar, how might a mobile application improve customer experience in your store? Do you foresee using a particular feature of a smartphone, like the camera or compass, to improve customer experience? Would customers use the app for in-depth comparison shopping or a last minute gift?

Do you have the resources to develop a mobile application?

Do you have the developers in-house at your organization that could build a native app or a web app?

The Mobile Market Today

There is a considerable amount of fragmentation in the mobile market; there are six major operating systems and hundreds of different devices. Living in the United States, the Apple iPhone consistently receives the most press, yet it's not the most popular platform in the United States. The number-one ranking currently belongs to Research In Motion, and the fastest growing platform is Google's Android--not the iPhone.

US Subscriber Market Share by Platform

Platform	Market Share May '10	Market Share Feb. '10	Point Change
RIM (Blackberry)	41.7%	42.1%	-0.4
iOS (Apple)	24.4%	25.4%	-1.0
Windows Phone (Microsoft)	13.2%	15.1%	-1.9
Android (Google)	13.0%	9.0%	4.0
Palm OS (Palm)	4.8%	5.4%	-0.6

Source: Comscore - http://www.comscore.com/Press_Events/Press_Releases/2010/7/comScore_Reports_May_2010_U.S._Mobile_Subscriber_Market_Share

On a Worldwide level, the market is still dominated by the Symbian operating system, though both the Android and iPhone OS are gaining quickly. However, note again that the iPhone is relatively small. So if you have international reach, simply creating an app for the iPhone may not provide the broad reach you are looking for, depending of course, on the countries that you are targeting.

Worldwide Market Share by Platform Operating System

Operating System	Q1 '10 Market Share	Q1 '09 Market Share	Point Change
Symbian (Nokia)	44.3%	48.8%	-4.5
RIM (Blackberry)	19.4%	20.6%	-1.2
iOS (Apple)	15.4%	10.5%	4.9
Android (Google)	9.6%	1.6%	8.0
Windows Phone (Microsoft)	6.8%	10.2%	-3.4
Linux	3.7%	7.0%	-3.3
Other OS's	0.7%	1.2%	.05

Source: Gartner -- <http://www.gartner.com/it/page.jsp?id=1372013>

In addition to the large variety of operating systems, there is a growing number of app stores for each platform. The six largest stores are the iTunes App Store, BlackBerry App World, Google Android Market, Nokia Ovi Store, Palm App Catalog and Windows Marketplace for Mobile¹.

So in other words, there is a proliferation of operating systems, smart phones, and app stores out there. And each of these operating systems and phones are developed in different languages (iPhone - objective C, Android, Symbian, Blackberry - java, Microsoft - C++ and C#, etc.). Is it realistic to develop a native app for each of them? What are the main advantages and disadvantages of native apps compared with mobile web apps, which are created with open web like html, css, and javascript?

The advantages and disadvantages of mobile apps for ecommerce

There are a lot of different reasons that a native application or a web application may be the right decisions for your organization. Some of the aspects of building native applications may weigh more heavily than others. In general, some of the top considerations are:

¹ source: <http://www.distimo.com/>

User experience:

In general, native apps are much faster than web apps, and they are trimmed down to match the features of the phone. If you're looking to create an app that places a premium on speed--like games, which need an especially fast response time--then a native app is currently the best approach. However, as network bandwidth and caching support improves, the delta between native app and web app speed will grow smaller. In addition to speed, consistency in design patterns is a factor in app usability. Native apps may have the edge here, as familiar interface conventions may make the interface more intuitive for users comfortable with using native apps on a particular device. Native app designers have full control over the look-and-feel on the device they are designing for, including full-screen support, unlike web app developers, who must account for the variation in how their app renders in different mobile web browsers.

Implication for retailers: If you are presenting a huge catalog of products, speed can be a big factor. Mobile web apps, which can take longer to load information because of network speeds and the limited caching ability of mobile browsers, can create a slower experience for customers. For example, users that are comparison shopping by having multiple browser windows open, or the ability to have persistent sign-in could create transaction delays. In addition, if you place a premium on controlling the exact appearance of the app UI, then creating a native app may be advantageous.

Access to device features:

If the app needs to be able to access one of the device features, such as a camera, compass, accelerometer, or address book, then a native app, in the short term, is the best choice. If you don't need access to all of these features, then a web app may work just fine. Plus, a geolocation API is available for most browsers that can give web apps the same access to position that a native app would. Currently, the World Wide Web Consortium (W3C) has a working group dedicated to creating open API's that would allow web apps to access other device features². In the meantime, there are some other solutions that are bridging the gap between native and web applications. Two of these, one appropriately called PhoneGap and the other called Sencha, are open source development frameworks for building cross-platform mobile applications. The idea is that you can use these frameworks to enable native device functionality using HTML, CSS, and JavaScript without having to code for a specific platform. In effect, with frameworks like PhoneGap and Sencha available, there is a growing class of hybrid apps that blur the line between native and web app³.

Implication for retailers: If you are simply displaying a catalog of products or using the app to search for store locations, then accessing device features may not be an issue. Geolocation is available whether or not you are using a native app or web app. The same goes for video. However, more sophisticated app functionality, like using the camera to scan barcodes, is currently much easier to implement on native devices.

² From <http://www.w3.org/2009/dap/>

³ See <http://www.phonegap.com/apps/> and <http://www.sencha.com/products/touch/demos.php> for examples of some "hybrid" applications

Monetization and Find-ability:

If you want to make money with a mobile application, then creating a native application available for sale in one of the many app stores⁴ is the best approach. App stores provide an easy way for consumers to buy apps in a central place without the need to hunt around the web for each app to download from the developer site. App stores especially benefit smaller organizations, which now have a large platform for distribution. And app stores free companies from having to setup an additional transaction process for purchasing and downloading apps. Many organizations feel that if their competitors are in an app store, then it makes sense for them to be there too, though many of these apps are little more than dedicated feed readers and bookmarks to a company's mobile website.

Implication for retailers: Be wary of simply creating a native app that just provides basic information (e.g. product info and store location). If you are a smaller retailer, the reach that an app store has may provide you with the ROI necessary for development. Very few, if any retailers are charging for their apps; I couldn't find any major retailer in the iTunes store charging for app downloads. Rather, they are providing their app for free⁵ and hoping the free price tag will generate additional sales.

Platform independence and choice of development language:

One of the biggest benefits for mobile web applications is that developers don't have to spend time trying to learn the nuances of development for each platform. In general, developers can create the content once, with a single codebase, and have it run across multiple platforms (especially for Webkit based browsers used in the iPhone, blackberry, android, and palm OS's). In this way, the app has the potential to reach more users without the added development costs that native app development would bring. Plus, the development team can code in the languages that they want rather than the language required by the OS.

Implication for retailers: If you are a larger organization in multiple locales, be aware of the large number of platforms you have to develop for to reach a bigger proportion of your users. Localization and development is harder with native apps than web apps.

Speed to market:

Development time has the potential to greatly impact time to market. Unlike web apps, it's much more difficult to make updates and fixes to native applications than to make a few changes to a web app and have it deployed across multiple platforms almost instantaneously. Instead, you are funneled into the corresponding process for each app store *everytime* you have to make a change, adding time to each design-debug-deploy cycle. There isn't any extra approval process time for web

⁴ List of mobile app stores: http://en.wikipedia.org/wiki/List_of_digital_distribution_platforms_for_mobile_devices

⁵ There are some third party vertical aggregators that do price comparison or deal finding that are paid applications.

apps, and no chance that a web application will be rejected by a third party because of a black-box approval process. Once the app is created and tested by the organization, it's ready to go out to the masses.

Implication for retailers: If you need to get out in-market as fast as possible, then a web app is the way to go.

Offline support:

One gap that exists between web-based and native mobile applications is the ability to work offline. Offline support allows people to continue to use an applications without a network connection. Then, once the connection reestablishes, their work is shared again with the cloud. Currently, web apps struggle in this area. Offline capabilities are supported in HTML5, though not all mobile browsers support them yet. Webkit, which is the most popular browser engine, has offline support, but not all browsers based on Webkit currently do⁶.

Implication for retailers: Areas with spotty network coverage aren't ideal for apps that can't handle a seamless offline experience for users.

Note that a more complete list of both advantages and disadvantages of mobile and web application development is used in the accompanying worksheet.

ecommerce apps in the market

I took a brief survey of some of the features that some larger retailers⁷ are using in their mobile applications (both native and web). Some common features currently in-market include:

- Store locator
- Shopping (sign-in required)
- Browsing/searching product and viewing a catalog
- Social - sharing outfits among friends via FB, Twitter
- Discounts (received when near a store)
- View video (e.g. of runway shows)
- Use of the accelerometer to do things like “shake” your phone to randomize choices
- Comparison price shopping while in-store
- Use of photo capabilities to match with a product/size of product, use for scanning QR or barcodes
- Free to download

⁶ Breakdown of HTML 5 support: <http://radar.oreilly.com/2010/05/mobile-operating-systems-and-b.html>

⁷ Retailers reviewed include Home Depot, Target, Walmart, Best Buy, Amazon, eBay, Ralph Lauren, Banana Republic, Sephora, Zara, and Tiffany.

The chart below summarizes some of the differences between major retailers that have a native app (in this case an iPhone app), a web app or optimized mobile website, or both. In general, the functionality that most retailers use for each app is very similar. Some native iPhone apps use the camera as a way to give the user an increase in information (e.g., through barcode scanning in-store), but in general the iPhone apps are just a repurposing of the retailer's mobile website. Based on the reviews from the iTunes store for many of these retailers, consumer expectations are fairly high when it comes to these apps, and many have received mediocre or poor reviews because of their minimal functionality and buggy design. Tiffany & Co. is one of the exceptions---it does an excellent job of using the features of the iPhone in a way that is quite novel compared with a desktop web experience, yet provides real value to consumers.

Implication for retailers: There's an opportunity here to give users a value-added experience beyond a simple repurposing of web content: things such as full purchasing capabilities, video integration, use of native functionality like the compass and the camera, caching product catalogs for use offline, etc.

Implication for retailers #2: Should a retailer build both a mobile app and a native app? The answer to this question will vary quite a bit based on the retailer. However, in general, based on this brief retailer survey, there seems to be quite a bit of redundancy between the two. Again, if there is an opportunity to add value to the consumer experience or brand by creating both, then it might make sense. For example, Sephora uses their iPhone application and their web application in very unique, but supporting ways.

Retailers with <i>similar</i> web app and native app functionality	
Retailer	Differences/comments between native and web app*
eBay	Almost identical functionality.
Zara	Almost identical. Both are localized catalogues (no purchasing, saving, emailing, etc.) Native app: allows you to save your country preference (web doesn't).
Target	Very similar. Native app: Scan barcodes for info
Walmart	Very similar: Able to take a photo in native app
Best Buy	Very similar. QR code scanning with iPhone application.
Amazon	Very similar. Native app: lets users take photos of items for identification and price comparison
Retailers with <i>different</i> web app and native app functionality	
Ralph Lauren	Different. Native app: Video clips, designer lookbooks, ability to call a personal shopper, 360 item rotation views. Cannot buy via native app. Minimal catalog. Web app: large product catalog, cart functionality
Sephora	Very different. native app: iPhone app is a game, where you can take picture, add tokidoki accents to it and upload to FB for chance to win \$500 gift card. web app: allows only viewing of product reviews
Retailers with only native app available	
GAP, Inc.	Sends coupons for nearby stores, track and share your outfits with others, shake phone for new outfits, shop, find stores
Home Depot	iPad optimized website (not smartphone)
Tiffany & Co.	Ring Finder app allows user to browse styles and determine ring size

*Note: differences here refer to functionality only. Aesthetic differences are quite variable.

How People Are Using Smartphones to Shop:

There are a number of recent reports about how smartphones are impacting retail. Not surprisingly, surveys are finding that people are increasingly using smartphones for purchases, comparison shopping, and price checking:

Key findings from Compete's Q3 2009 Smartphone Intelligence survey include:

- The most popular mobile shopping-related activities are still research related – 41 percent of iPhone users and 43 percent of Android users are most likely to check sale prices at alternative locations from their mobile phones while they are shopping.
- The second most likely activity is accessing consumer reviews, with 39 percent of iPhone owners and 31 percent of Android owners investigating reviews from their handset before they purchase

source: http://www.competeinc.com/news_events/pressReleases/250/

A recent Pricegrabber.com survey (2010) concluded that:

- More consumers with Web-enabled phones say they purchase online with their mobile phones as compared to last year, 13 and 10 percent respectively. Consumers are also using their phones to check prices (22%), research products (21%) and purchase online (13%) more as compared to last year.
- Consumers who purchase from their mobile phones indicate that they buy items such as ringtones and apps (61%), consumer electronics (57%), books (42%), clothing (34%), and jewelry (16%). The percentage of consumers with Web-enabled phones purchasing books and consumer electronics has most significantly increased as compared to last year.
- Online consumers (with or without Web-enabled phones) say they expect to be comparing prices (24%) and purchasing items from their mobile phones (22%) in the next 12 months.
- Online shoppers ages 25 to 34 indicate more likely to purchase online from their Web-enabled phones than any other age segment (see page 15).

source: "Smartphone Shopping Behavior", https://mr.pricegrabber.com/Smartphone_Shopping_Behavior_CBR.pdf

A recent Deloitte survey looked into how people use their mobile phones during food shopping activities. Of the 7% of consumers that use their mobile phones while in-store, they perform the following activities:

- 53% compare prices
- 44% get/redeem coupons/discounts
- 28% get nutritional information
- 22% read product reviews
- 22% visit the food company's website for information

source: "2010 Consumer Food Safety Survey", http://www.deloitte.com/view/en_US/us/press/Press-Releases/1912cf06d7c38210VgnVCM100000ba42f00aRCRD.htm

A recent Comscore survey looked at application vs. browser usage on smartphones:

- A very small percentage of smartphone users are accessing retail websites via a mobile application (2.1%)
- Both usage of the browser on a smartphone as well as usage of applications grew over the past year (April '09 vs. April '10), 11% and 12% respectively.

source: "Social Networking Ranks as Fastest-Growing Mobile Content Category", http://www.comscore.com/Press_Events/Press_Releases/2010/6/Social_Networking_Ranks_as_Fastest-Growing_Mobile_Content_Category

Finally, a recent Mobile Marketing Association study (2010), concluded that:

- 56% of mobile content purchases were made through a carrier, and 43% used a bank or credit card account for payment.
- Across all categories of transaction types, most respondents considered m-commerce to be "secure and trustworthy."

source: "May 2010 U.S. Mobile Consumer Briefing", <http://mmaglobal.com/research/mma-may-2010-us-mobile-consumer-briefing-mobile-commerce>

Future Considerations

There are a number of trends emerging that will impact the mobile application development space:

- The rise of open technologies like HTML5, CSS, and Javascript have the promise to make much of the functionality currently only available via native apps also available to web apps. And many companies (see Apple) are eschewing Adobe Flash in favor of open technologies.
- Faster and more available networks will likely continue to close the performance gap between native and web application performance.
- Tablet PC's like the iPad are presenting more opportunities for organizations to create engaging experiences for users. Will this further solidify the market for native applications, or will there will be more opportunities for open technologies to thrive on a larger mobile canvas?
- The trend of the mobile phone as credit card is increasing and especially popular in Asia. How will the ability to wave a phone in front of an item or kiosk to purchase, or transfer money directly via cell phone to a merchant or friend change merchandising?
- The increase of real-time offers delivered over mobile networks is on-the-rise, as are apps that offer rewards everytime users "check-in" at certain stores, or push out coupons in-store.

How to use the accompanying worksheet

Organizations interested in a more quantitative way to determine whether or not they should develop a native or web app should take a look at the accompanying worksheet. The list of characteristics and requirements is certainly not all encompassing, nor is the score system exact. But it does provide a good starting point for analysis. Characteristics/requirements are broken down into general categories: technical development, user experience, marketing and promotion, content consumption, financial, and intangibles.

1. Start by reviewing the “Importance” and “Degree of Difficulty” for each characteristic/requirement (green colored columns D and E marked “Project Specific Requirements”). Think about how important each of these characteristics are (the “Importance”), and how difficult it is to implement each particular characteristic (the “Degree of Difficulty”).
2. Then, fill in each of these columns based on a low, medium, or high scale by simply typing in “Low”, “Med”, or “High”. For example, if “Platform Independence” is very important, but easy to implement based on resources available, you would mark “Importance” as “High”, but “Degree of Difficulty” as “Low”.
3. After filling out each characteristic, you’ll see the total score automatically tallied at the top and a recommendation as to whether to consider a mobile web application or native application.
4. The “Platform Capabilities section (blue columns B and C) are a subjective evaluation of the current capabilities of both a web app and a mobile app. If you feel that these need to be adjusted, or certain characteristics need to be added, then certainly add or adjust them. However, the Total Score at the top should be equal when the Project Specific Requirements (green colored columns D and E) are of equal weight (e.g., both are “Low”, “Med”, or “High”).

Note: The Scores section (orange colored columns F and G) are used to sum a weighted average. There’s no need to modify this section unless you want to change the scoring system.