



Mobilizing the Enterprise with Off-the-Shelf Apps and Custom Mobile Solutions

Whitepaper sponsored by SAP

Prepared by

Dr. Phil Hendrix, Director immr



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Introduction

For organizations competing on customer experience and employee performance, mobile represents the latest battleground. While mobile apps aimed at consumers capture more attention, mobile solutions that enable business units and employees to perform and compete more effectively are equally important. As enterprises integrate mobile more fully across business processes, two important developments, both driven by employees, complicate matters:

- **BYOD** - BYOD (Bring Your Own Device) refers to employees bringing personal devices into the workplace and using them for business purposes. Despite the simple acronym, BYOD presents significant challenges, especially involving security and data access.
- **BYOA** - Following in the wake of BYOD, BYOA (Bring your own App) refers to the adoption and use of mobile apps – both consumer and enterprise – by employees, teams and even business units. While the tagline "there's an app for that" (now trademarked by Apple) was initially aimed at consumers, the number of mobile apps for business users is rapidly growing. Given the popularity of consumer apps, it's no surprise that employees are downloading and bringing mobile apps into the enterprise.

With continuing advances in wireless networks (4G and Wi-fi) and an ever expanding selection of compelling new mobile devices (including smartphones and tablets), BYOD and BYOA in the enterprise will continue to expand.

Left unchecked, however, BYOD and BYOA can be counterproductive, costly and risky for organizations. To achieve the potential and mitigate the risks of BYOA, enterprises have two options: (i) they can acquire and provide employees with "off-the-shelf mobile apps" or (ii) they can build (or have built) "custom mobile solutions." Various combinations of these two approaches represent a third option.

Off-the-Shelf Mobile Apps

Developers are publishing more and more off-the-shelf mobile apps for business users, while SAP, Salesforce.com and others are expanding enterprise app stores.

Custom Mobile Solutions

"Purpose built" and deployed for a multitude of applications, custom mobile solutions are more holistic and robust, often relying on mobile middleware and other technologies to extend backend databases to mobile apps and users

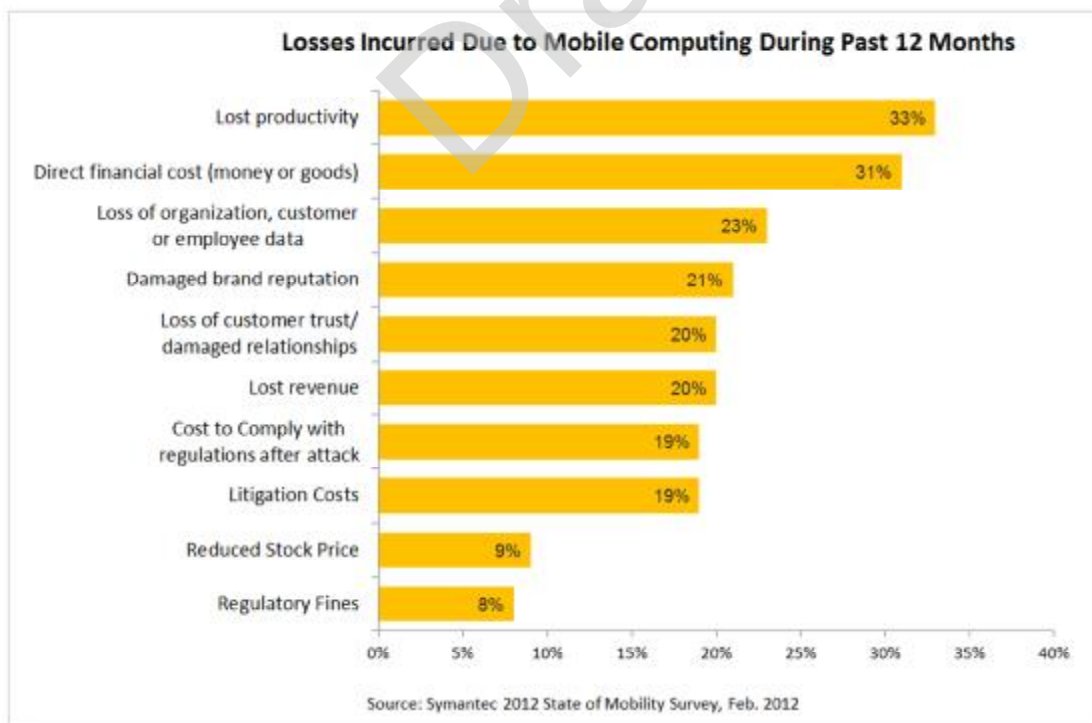
This whitepaper compares and contrasts these two approaches – "off-the-shelf" mobile apps vs. custom mobile solutions – summarizes their pros and cons and pinpoints the role for each in mobilizing enterprises. As the name implies, custom mobile solutions are built for specific purposes, with features, functionality, UI (user interface), and other aspects tailored to the organization's objectives and to users. Especially for "strategically important" opportunities and applications with unique requirements, custom mobile solutions offer significant advantages for an enterprise. Part 2 of the whitepaper describes custom mobile solutions recently developed for enterprises, drawing on the experience and expertise of the [SAP Mobility Design Center](#) and leading developers who partner with SAP.

Drawbacks and Risks of BYOA (Bring Your Own App)

While the challenges of BYOD are well documented, equally challenging and perhaps even more pernicious are the drawbacks and risks associated with BYOA (“Bring your own App.”) Accountable for achieving results and often unaware of the larger risks, employees, teams and even business units are seeking out and adopting off-the-shelf mobile apps for their purposes. While many off-the-shelf mobile apps are well designed, well-built and perfectly suitable for some enterprise applications, end-users in the enterprise often unknowingly overlook the drawbacks and risks.

The primary drawbacks and potential risks associated with BYOA include:

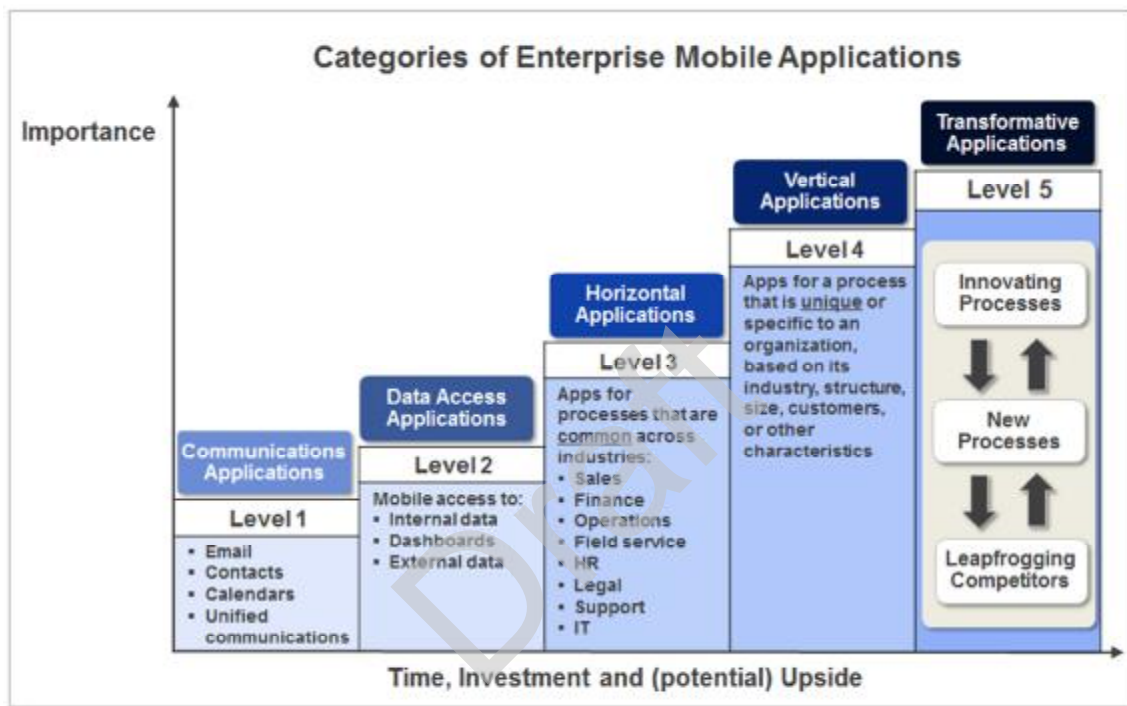
- Ø Fragmentation – when teams in different locations and business units “do their own thing,” an enterprise can end up with multiple competing apps
- Ø Support – when issues arise, BYOA makes it difficult for employees to get support and resolve issues
- Ø Total cost of ownership (TCO) – as discussed later, the initial lower cost of off-the-shelf apps can mask other costs, including security, support, training, upgrades and opportunity costs
- Ø Security – as the chart below reveals, mobile devices and apps expose enterprises to significant risks with enormous consequences. While security is a concern with any mobile application, BYOA exposes an organization to even greater risks, including data leaks and losses.



The challenge for enterprises is to harness end users’ interest and involvement, identify and prioritize opportunities and deliver mobile solutions that yield the benefits while mitigating these risks.

Choosing between Custom Mobile Solutions and Off-the-Shelf Apps

As shown below, mobile applications for enterprises fall into five broad categories, depending on their purpose, complexity, and whether the corresponding processes, types of data and systems are common across enterprises or unique to an organization. Another important consideration is strategic intent – to what extent does the organization intend to leverage the application for competitive advantage?



In the Lower Levels (1-3) applications are common across organizations and users, while in Levels 4 and 5 applications are either materially different or possibly even unique to a particular enterprise or situation.

Level 1-3 Applications – Advantage Ü Off-the-Shelf Mobile Apps

In essence, apps in Categories 1-3 mobilize processes, allowing employees to be equally productive whether they are at their desks or mobile. In most instances, since user requirements are consistent across industries, off-the-shelf mobile apps are sufficient and offer a number of advantages – the primary advantages are (i) readily available; (ii) satisfies the needs of most users; and (iii) typically (but not necessarily) lower (acquisition) cost. Off-the-shelf apps can also offer other advantages, such as consistent look and feel with other apps (especially from the same developer), access to user community; etc. On-going feedback and suggestions from a large user group are particularly important, as they help developers identify and bring new and improved versions to market.

Level 1-3 Applications	
Level 1 – Communications Applications	<ul style="list-style-type: none"> • Mobile apps enabling communications and scheduling – e.g., email, contacts, shared calendars, instant messaging, etc. • Most enterprises initially deployed with integrated solutions (apps + devices + platforms); more recently, device agnostic solutions are gaining popularity
Level 2 – Data Access Applications	<ul style="list-style-type: none"> • Make it easier for employees to view, download, update and share data • Access to corporate and other data is increasingly a requirement for employees away from their desk or office (e.g., meetings, visiting customers, traveling, etc.)
Level 3 – Business Process Applications (Horizontal)	<ul style="list-style-type: none"> • Level 3 applications are for “horizontal processes,” e.g., processes that are common across organizations • Examples include HR processes, such as hiring and talent management, and many other relatively standard processes (accounts payable, travel and expense reimbursement, requisitions, etc.)

For most Level 1-3 applications, the advantage goes to off-the-shelf mobile apps. While some consulting and support may be needed to deploy, little if any customization is required and custom development isn't likely to significant benefit users or the organization. Since off-the-shelf apps are standardized and their development costs spread across a larger base of users, they are typically available at a lower cost (compared to custom mobile solutions) – however, when total cost of ownership is considered the difference may be much smaller, as discussed below.

Levels 4 - 5 Applications – Advantage Ü Custom Mobile Solutions

In contrast to lower level applications, business processes in Level 4 are unique to an organization or at least differ significantly from the same process in other organizations – hence, the name Vertical Processes. As an example, mobile solutions for airline gate agents are not only specific to the industry, but also likely to vary by carrier, country, domestic vs. international routes, etc.

Level 5 consists of “transformative” mobile applications designed to innovate, transform or even create an entirely new process for an organization. The primary intent of these apps is to gain competitive advantage by developing unique capabilities that are unmatched by competitors.

Level 4-5 Applications	
Level 4 – Vertical Processes	<ul style="list-style-type: none"> • For processes that are unique or materially different for an organization • Varies by industry, but are often under operations, customer-facing (e.g., B2B sales; retail POS; etc.), and other core business processes
Level 5 – Transformative Applications	<ul style="list-style-type: none"> • Distinguished by an organization's “strategic intent” • Goal is to gain competitive advantage by deploying mobile solutions that: <ul style="list-style-type: none"> Ü Innovate an existing process Ü Develop a new process Ü Leapfrog competitors



A classic example of a Level 5 application is the [mobile DIAD](#) developed by UPS some 20 years ago that allowed its drivers to scan packages at time of pickup – the solution not only saved time and paper (59 million sheets a year) but more importantly enabled real-time package tracking.

Rarely can the requirements of Level 4 and Level 5 applications be met with off-the-shelf applications. In these two scenarios, custom mobile solutions are likely to be the only feasible option – fortunately, custom solutions offer organizations a number of significant benefits, as summarized below:

Benefits of Custom Mobile Solutions for Level 4 and 5 Applications

Custom mobile solutions allow an organization to:

- ü Tailor features and functionality to users' needs and enterprise objectives
- ü Develop a UI (user interface) that is purpose built, tested with and optimized for the organization's end-users
- ü Tightly couple the solution with their existing enterprise systems
- ü Plan for and scale the solution as needed
- ü Iterate and introduce “new and improved” versions as requirements and market opportunities dictate

The Importance of Transformative Mobile Applications

Transformative mobile solutions are really at the heart of a company's strategy – identifying and developing such solutions forces an organization to think creatively about how to leverage mobile to transform processes and gain competitive advantage. While an in-depth discussion of mobile-enabled strategy is beyond the scope of this whitepaper, the following examples illustrate the importance and the critical role that custom mobile solutions play.

Innovating Processes

Companies in virtually every category, including B2C and B2B, are investigating, experimenting with and deploying mobile solutions that radically improve processes. For example:

- In retail, Apple has employed mobile solutions to transform the entire customer experience, from browsing to paying and checking out.
 - Other retailers are developing and deploying on tablets solutions that (i) recognize customers (who have opted in) as they enter the store; (ii) call up customers' profile and purchase history; and (iii) allow sales associates to illustrate how new products would appear for the customer, e.g., furniture in their home or even clothing and cosmetics on the individual.
 - Partnering with automakers, hotels are introducing mobile solutions that allow guests to bypass registration and use their mobile devices to check-in, as the key to their room, to view entertainment, order room service, etc. These mobile solutions reduce cost and enhance guest experience.
-

New Processes

Working with technology vendors, innovative cities are using wireless and mobile solutions to [ease parking problems](#) by (i) showing drivers the locations of available spaces; and (ii) dynamically setting prices to shape demand and reduce congestion. The solutions also eliminate a big source of frustration by allowing individuals to pay remotely from their mobile devices – “feeding the meter” takes on a whole new meaning.

GE and other manufacturers are using wireless to monitor the condition of their equipment in labs, hospitals and other customers’ premises – when anomalies are detected, problems can be diagnosed and, if needed, technicians dispatched before the equipment breaks.

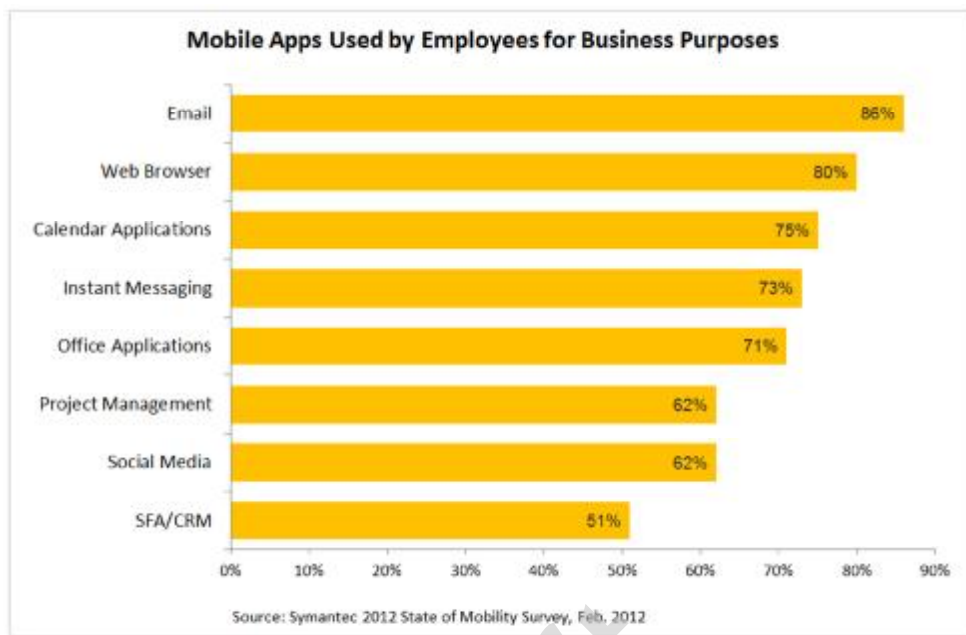
Coca-Cola is using wireless to not only monitor its vending machines, but also detect surrounding conditions (weather, temperature, etc.). Based on this information, the company is experimenting with varying offers and pricing tied to context – for example, specials based on time of day, weather, crowds, etc.

Leapfrogging Competitors

Disney has developed a mobile app designed to enhance guests’ experience in its theme parks – features include showing up-to-date wait times at attractions; allowing guests to sign up for “fast passes,” view the location of Disney characters, etc. All aspects of the app, from look and feel to integration with systems that are unique to Disney, are custom built.

Companies are using a variety of methods to “out-innovate” competitors. Home Depot and Kraft, for example, recently sponsored the [“Big Brand Hackathon”](#) in San Francisco – senior executives from the two companies, including Home Depot’s CMO, spent much of the weekend in a room filled with innovative young developers, most in their 20’s and some in their teens. The mobile hackathon was won by a 17-year old high school student – upon winning, she was immediately (literally, on-stage) offered a summer internship by Facebook, illustrating the intense competition for creative, talented developers.

As shown on the next page, to date enterprises have focused much of their attention on lower level mobile applications (categories 1-3). For many organizations, these represent an appropriate starting point, as they (i) are important in their own right, and (ii) with off-the-shelf applications readily available solutions can be deployed quickly and at a relatively low cost.



Depending on the status of competitors' mobile efforts, enterprises may gain temporary advantage by deploying lower level mobile apps more fully. In many respects, however, these applications are now "table stakes" for enterprises. As the examples above suggest, the biggest opportunities to gain competitive advantage are with Level 4 and 5 mobile applications.

As enterprise seek to innovate with mobile solutions, off-the-shelf apps aren't likely to be available and even if they are, they won't allow an organization to leapfrog competitors. Fortunately, custom mobile solutions, with "purpose built" features, functionality, UI (user interface), and other aspects tailored to users and the enterprise fill this role nicely.

Evaluating Off-the-Shelf Apps vs. Mobile Solutions – 12 Criteria

In addition to off-the-shelf apps and custom mobile solutions, hybrid apps represent an in-between category of approaches. With hybrid apps, configuration options are built into off-the-shelf apps to make them “semi-customizable.” Determining whether an off-the-shelf app, hybrid app or custom mobile solution is best for a particular application depends on a number of considerations, especially business objectives, user needs and options available. Understanding characteristics of the three types of solutions is also important, as summarized below and explained in this section.

Developing and Deploying Enterprise Mobile Apps – Criteria for Evaluating Alternative Approaches

Characteristic:	Off-the-Shelf Mobile Apps	Hybrid Mobile Apps	Custom Mobile Solutions
1. Functionality	Pre-determined	Selection of features	Per requirements
2. User Interface	Standardized	Some aspects customizable	Fully customizable
3. Device/OS Compatibility	Varies	Varies	Per requirements
4. Integration with back-end systems	Varies, but typically limited	Varies	Tightly integrated
5. Performance	Good, on predefined criteria	Varies	Optimized per requirements
6. Scalability	Varies	Varies	High
7. Support	Typically limited	Varies	SLAs
8. Security	Varies	Varies	Highest
9. Upgrades	According to vendor's plans	According to vendor's plans	Per client requirements
10. Time to Develop	Least time	Less time	More time
11. Time to Deploy	Least time	Varies	More time
12. Cost	Lowest cost	Intermediate cost	Highest cost

Note: While the characteristics above hold in general, specific vendors' apps and solutions may vary.

1. Functionality

At the core of a mobile solution are features and functionality – which tasks does the app enable users to accomplish? Is an organization better served by “buying” and deploying an off-the-shelf mobile app or building a custom mobile solution? Comparing the functionality of available apps against requirements – including those of users, the business unit and IT – is a logical starting point to determine which alternative is best in a particular situation.

- Off-the-shelf apps offer a number of pre-determined functions, which are often sufficient for Level 1-3 type applications.
- Custom mobile solutions – and to a lesser degree hybrid apps – are designed to satisfy a client’s exact requirements, with functionality prioritized based on importance, cost and other criteria.
- As enterprises leverage mobile to transform and innovate processes, custom mobile development are required – having developed solutions, organizations may also take steps to protect and prevent competitors from copying their IP.
- As mentioned earlier, while off-the-shelf apps benefit from on-going user feedback and suggestions - which over time can lead to new and improved versions with enhanced functionality – the opposite can occur as well, leaving enterprises with an “aging” app that fails to meet emerging user or business requirements. Thus, enterprises must also weigh how well a particular off-the-shelf app will be maintained and improved over time, especially as the business and users’ requirements change.

2. User Interface

A key element of mobile apps, the UI (user interface) is often the single most important factor affecting users’ experience and their assessment of usability. While most off-the-shelf apps offer a standardized UI, some also permit organizations and users to make adjustments to suit individual preferences. With a custom mobile solution, the UI can be tailored, tested and validated to insure that it matches exactly an enterprise’s users. Given the impact on usability and productivity, the ability to optimize the UI for an enterprise’s users could justify the development of a custom mobile solution.

3. Device/OS Compatibility

The BYOD trend is introducing a wide range of mobile devices and operating systems into the workplace. Some off-the-shelf apps are developed for particular platforms, such as iOS, while others are compatible cross-platform. With new devices, especially tablets, and newer versions of operating systems continually being introduced, one of the key questions is whether an off-the-shelf app will support the mix of devices and platforms in an enterprise over time. Enterprises are well advised to check the compatibility of off-the-shelf applications with various mobile operating systems and devices – or at least their ability to support the most critical features (UI, security and support) across platforms. Similar choices must be made when developing a custom mobile solution – with custom development, however, the enterprise can specify which platforms the app must run on and decide how best to maintain the app over time as operating systems, APIs and capabilities evolve.



4. Integration with Backend Systems

Often the most complex requirement in deploying mobile solutions for enterprise workers is integrating with backend systems and databases. Naturally, custom mobile solutions can be tightly coupled with enterprise systems while off-the-shelf apps may require either middleware or custom installations to make them work. Enterprises developing applications that require tight integration with backend systems will generally find that custom mobile solutions are best suited.

5. Performance

Within a particular category, the performance of mobile apps on various dimensions – speed, resource intensity, etc. – can vary widely. Users have a low tolerance for mobile applications that aren't fast, fluid and functional. Another critical aspect is the impact of a solution on mobile device battery life – how mobile solutions manage network access, frequency and data transmission have an enormous impact on batteries. Needless to say, apps and solutions that drain battery life are frustrating and ultimately likely to be ignored by users. With custom mobile solutions, target levels of performance under various use cases and conditions are developed in concert with decision-makers and users. Developers then design, measure and optimize the solution's performance to meet these targets.

6. Scalability

What happens when thousands or even tens of thousands of employees from around the world are using a mobile solution, uploading and querying in real-time data distributed across multiple databases? Are the app and supporting systems capable of handling that load? Or does the response time slow or worse, does the app crash? Designed in and tested during development, scalability insures that performance levels are maintained under a variety of demanding loads and conditions. While not as immediately apparent as other criteria, scalability – especially with off-the-shelf apps – can vary widely, potentially leaving enterprises and users vulnerable in mission critical situations.

7. Support

When users experience a problem or an issue arises with an upgrade, support proves critical. Typically, support for off-the-shelf apps is "best effort," which may be sufficient in some cases. In other cases, enterprises will require service-level agreements (SLAs) that specify response times and hold the developer accountable for performance. In addition to response time, quality of support can also vary, depending on the training, experience and capabilities of personnel. While design and testing reduce the need for support, no software or app is problem free – when support or fixes are required, the developer's ability to resolve problems dramatically affects users as well as the entire enterprise.



8. Security

In survey after survey, IT execs rate security of mobile apps as one of their top concerns – they recognize that risk extends well beyond mobile users to the entire enterprise. As adoption and use grow, mobile is increasingly in the cross-hairs of sophisticated hackers who are seeking to capitalize on any cracks that expose critical enterprise data and systems. In this on-going, epic battle, enterprises must be assured that apps – whether off-the-shelf or custom – incorporate the most appropriate security measures available. With custom mobile solutions, enterprises have more visibility and control over security, both in the initial development cycle as well as on-going refreshes and upgrades.

9. Upgrades

With off-the-shelf and hybrid apps, the availability, cost and frequency of upgrades are largely dependent on the vendor. For businesses requiring upgrades more closely aligned with their requirements and market conditions, custom mobile solutions provide more options and control.

10-11. Time to Develop and Deploy

While off-the-shelf apps are available for immediate deployment, the development cycle for custom mobile solutions – including design, build, testing and deployment – can range from weeks to months. To reduce development time and cost – for initial development as well upgrades – leading developers are using a variety of approaches, including agile methods, reusable components and iterative releases. These tools and best practices can dramatically shorten cycle time and time-to-deploy, an often critical consideration for business units seeking to gain competitive advantage.

12. Cost

Because development, support and other costs are spread across a wider customer base, off-the-shelf apps can usually be purchased and deployed at a lower cost compared to custom mobile solutions. Of course, costs are a function of the vendor's pricing for licenses, training, support and other elements – as a result, it's difficult to generalize and cost differentials may be smaller than one would expect.

When weighing the cost vs. benefits of various options, enterprises must consider not just "purchase price" but other costs as well. Total cost of ownership (TCO) includes (i) cost to implement and train users; (ii) security costs; (iii) upgrade costs; (iv) and "opportunity cost," based on the app's feature-functionality. When TCO is considered, some of the apparent differential in cost between off-the-shelf and custom solutions diminishes.

In addition, while custom mobile solutions can be "developed from scratch," in many cases there are opportunities to leverage and reuse design modules from other in-house custom development efforts, with few if any compromises. This can speed development and lower cost.



In general, compared to off-the-shelf apps, custom mobile solutions are likely to require more up-front time and (possibly) cost more to develop and deploy. Enterprises must carefully weigh the costs – including TCO over the life of the solution – and benefits and invest in custom solutions where the need and payoff are greatest.

How Consumer Mobile Experiences Impact Employees' Expectations

Over the last five years consumers have experienced a remarkable period of mobile innovation – as a result, individuals have expectations for mobile apps and solutions that they carry with them into the workplace. The profound, sweeping effects of these expectations are often described as the “Consumerization of IT” (CoIT). Specific mobile innovations shaping users’ experiences and expectations for enterprise mobile apps are described in the table below. As enterprises deploy mobile solutions, they must recognize the capabilities that users have come to expect and, where appropriate, incorporate them. Mobile apps and solutions that fail to deliver on these capabilities may be resisted by employees.

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Mobile Capabilities Shaping Users' Experiences and Expectations



BYOD (Bring Your Own Devices) – Employees expect and prefer to use the same device(s) at work that they use for personal reasons. This phenomenon, known as “Bring your own Device” (BYOD), is growing by leaps and bounds. As a result, enterprise mobile apps must often support multiple devices (PCs, tablets, smartphones) as well as multiple operating systems (Windows, Android, iOS).



Ubiquitous Connectivity – Employees expect to access and use mobile when on the go, using 3G/4G cellular, as well as in locations equipped with Wi-fi (both public and private). When wireless connections are not available, individuals expect to be able to work “offline” and reconnect to “live data” as soon as a wireless connection is reestablished.



Access to Apps – Individuals expect to be able to discover, download, install and use mobile apps relevant to their jobs with little if any “friction.” In the enterprise, this expectation clearly needs to be balanced by MDM (mobile device management), which allows organizations to manage which users have access to apps and data.



Social (Discovery, Exchange, Collaboration) – Given the phenomenal growth and popularity of “social” – not just Facebook, but Twitter, LinkedIn and others – individuals are accustomed to discovering and exchanging perspectives with others in their networks.



Location Aware – Since mobile devices are “location aware,” individuals expect apps to (i) recognize their locations, where appropriate; (ii) filter geo-coded information accordingly; (iii) in real-time, refresh and display information using maps and other visual user interfaces.



Ambient Connections – Equipped with cameras and image recognition capabilities, mobile devices are now being used to scan and recognize objects and symbols, facilitating and simplifying a wide range of tasks – “tags” such as bar codes and QR codes are becoming increasingly popular, while even more intelligence and functionality can be embedded in NFC and other emerging technologies.



Cloud – With near-instant access to data and capabilities that reside “in the cloud,” mobile devices can now process huge amounts of data and perform complex, demanding computing tasks. “Big data” and algorithms are driving innovation and shaping user experience in every sphere of mobile, delivering highly personalized, context-aware user experiences.



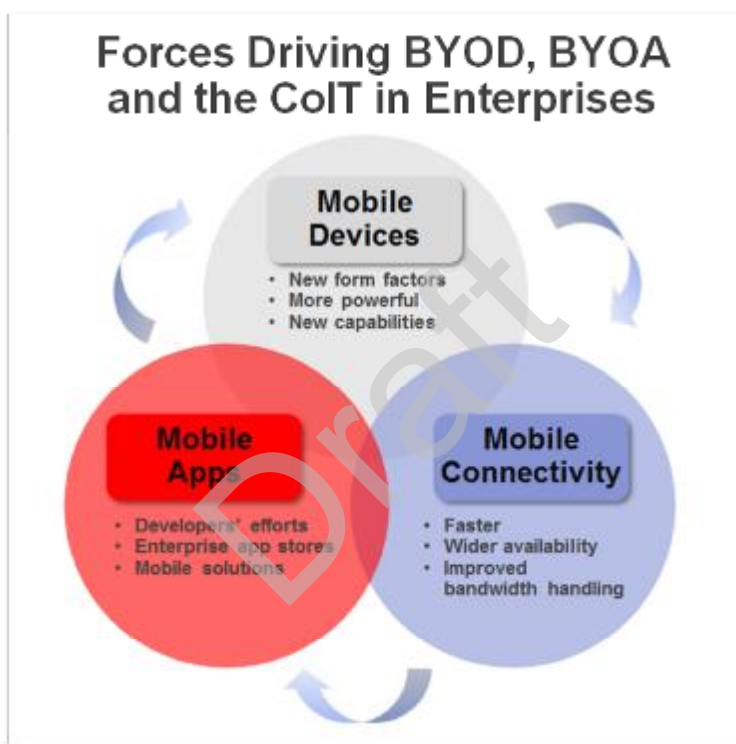
Intelligence – A growing number of apps incorporate “intelligence” – for example, Apple’s Siri leverages voice recognition and AI (artificial intelligence) to provide an incredibly user-friendly but effective experience. Apps such as Layar incorporate Augmented Reality to present information in more intuitive ways.



Gamification – Increasingly, developers are turning to gamification, behavioral economics and other principles to make mobile apps more engaging. Drawing on the success of mobile games and apps such as Foursquare, gamification incorporates rewards, challenges, social influences and other principles to make apps more engaging, satisfying and even fun. While not applicable in all instances, sales, learning and other apps that engage are likely to benefit from gamification.

Conclusion

Since the iPhone was introduced five years ago, the widespread adoption of smartphones and mobile apps have combined with widely available, fast wireless networks to make mobile ubiquitous. A recent survey found that nine out of ten individuals keep their smartphones “within reach” 24 hours a day, while another study revealed that individuals check their phones on average some 15-20 times a day. Mobile is even entering the subconscious, with some users sensing that their device is vibrating even when it is not, a phenomenon known as “Phantom Vibration Syndrome.”



While a just released study reports that fewer than 15% of mobile apps are “enterprise apps,” the trends discussed above – BYOD, BYOA and CoIT – are likely to continue unabated. More and more employees expect – even insist – that they have access at work to the kinds of mobile solutions they have gotten accustomed to using and depend on as consumers. Of course, customers also expect mobile to be an integral part in their dealings with companies.

Enterprises will continue to face increasing pressure from customers and employees to incorporate and leverage mobile in their strategies. For enterprises focused on lower level applications (1-3), off-the-shelf mobile apps represent an appropriate starting point for mobile development. For more advanced enterprises – focused on Levels 4 and 5 – custom mobile solutions represent the most, and in some



cases, only viable path. When weighing the pros and cons – especially feature-functionality, scalability and security – custom mobile solutions will prove advantageous for those enterprises.

To recap, the benefits of custom mobile solutions can far outweigh the costs and, with agile methods, solutions can be developed and deployed surprisingly quickly (weeks instead of months). The most significant advantages of custom mobile solutions include:

- Features and functionality tailored to enterprise objectives and users' needs
- Optimized UI (user interface)
- Tightly coupled with existing enterprise systems
- Built to scale
- SLA's for support, reducing downtime and user frustration
- Enterprise grade security
- TCO – up-front cost may be higher, but offset by lower costs on other components
- Control over timing of upgrades, based on the organization's requirements

Of course, as with any type of software, the cost and relative merits of various mobile solutions must be carefully considered, along with the capabilities of partners who specialize in designing, developing and deploying mobile solutions. Part 2 of this whitepaper examines in more detail custom mobile solutions, describing the development process, showcasing case studies, and outlining criteria that enterprises can use to evaluate and choose development partners to work with.



About the Author

Dr. Phil Hendrix is the founder and Director of [immr](#), a research and consulting firm that helps clients bring innovative new products and services to market. Dr. Hendrix helps clients uncover customer needs, optimize product/service features, achieve competitive differentiation and accelerate market acceptance. He is also an analyst with [GigaOm Pro](#), focusing on mobile, location and m-commerce, in particular.

[Recent reports](#) include Hyperlocal Mobile Advertising (Feb. 2012), Tuning into Consumers' Digital Signals (Oct. 2011), SoLoMo – Empowering Consumers and Transforming Shopping (Sept. 2011), Market Outlook for Tablets (April 2011) and Location - the Epicenter of Mobile Innovation (Feb. 2010). Phil is currently conducting significant research on consumers' adoption and use of mobile apps, particularly in M-commerce.

Before founding immr, Phil was a partner with DiamondCluster (now [PwC Advisory](#)) and a principal with Mercer Management Consulting (now [Oliver Wyman](#)). Previously, he was a professor at Emory University and the University of Michigan, where he taught courses in research, buyer behavior and marketing strategy. Phil received his PhD in Marketing from the Graduate School of Business, University of Michigan.

Phil can be reached on [Twitter](#) at @phil_hendrix or at info@immr.org.