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A Guide to Successfully Deploying Enterprise Mobile Applications

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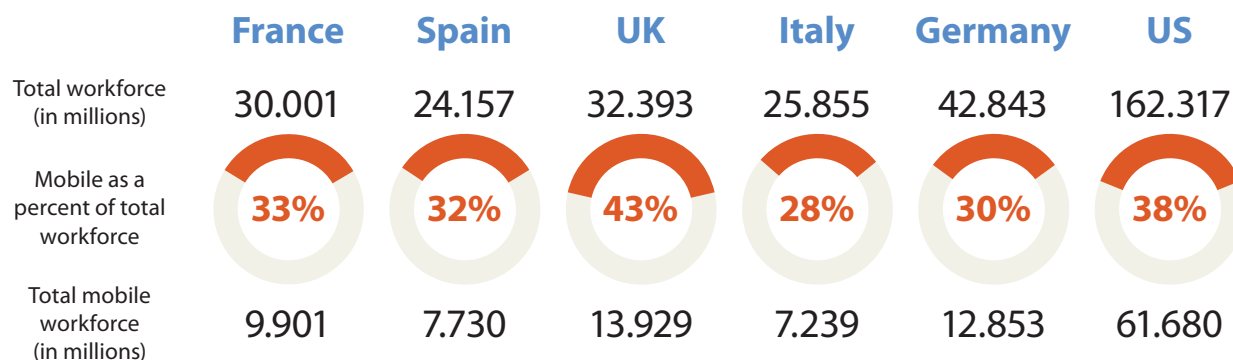**Chris Marsh,** Senior Analyst, cmarsh@yankeegroup.com

Why Are So Many Companies Launching Mobile Applications?

The growth of mobility in the enterprise has been an eventful journey so far. In only a short time, it has moved from the preserve of senior executives and dedicated mobile field staff to have a much wider applicability as workers across functions and job roles bring their personal mobile technologies to work. Yankee Group's 2011 US Enterprise Mobility: Employee Survey, Q1-Q2, and European Enterprise Mobility: Employee Survey, Q2, show that 35 percent of employees now use smartphones in the course of their work, 53 percent use laptops and 7 percent already use a tablet. Traditional enterprise IT cannot match the quality of end-user experience delivered by consumer mobile technology, and thus IT has been left behind by the rapidity with which the technology has exploded onto the scene.

This quality of experience and the familiarity employees have with their own technology means they naturally resort to using their own devices and applications for work. With just over 60 million mobile workers in the U.S. (38 percent of the entire workforce), nearly three-quarters of companies consider working from home or on the road as part of their wider organizational culture, and the vast majority of companies now believe these workers are as productive as those working in an office (see Exhibit 1). Mobile professionals are leading the way as executives, managers, administrators, public servants and other knowledge workers have spread mobility outward across different job roles and downward from executives to non-managerial staff.

Exhibit 1: The Breakdown of the Mobile Workforce in the US and Europe
Source: Yankee Group's 2011 US Enterprise Mobility: IT Decision-Maker Survey, Q1-Q2, and 2011 European Enterprise Mobility: IT Decision-Maker Survey, Q2; and ILO statistics from 2009 (a growth rate forecast for 2011 from averaging the growth rate from most recently available two years' statistics)

	France	Spain	UK	Italy	Germany	US
Total workforce (in millions)	30.001	24.157	32.393	25.855	42.843	162.317
Mobile as a percent of total workforce	33%	32%	43%	28%	30%	38%
Total mobile workforce (in millions)	9.901	7.730	13.929	7.239	12.853	61.680

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Along with the growing mobile workforce, a number of additional factors are driving growth in mobile applications. Key factors include the evolution of higher-speed mobile networks, the explosion of smart mobile devices, users' familiarity with apps and mobile app stores, and a decrease in the costs associated with developing, distributing and maintaining mobile applications. This has spurred companies to look beyond mobile e-mail and basic mobile access to corporate databases and consider other applications to liberate enterprise data and more directly impact key business processes.

This whitepaper provides a framework for CIOs on how to create a mobile application strategy for their business. It gives a step-by-step guide to the different stages involved, from choosing a focus, to building and deploying, to the ongoing support of enterprise mobile applications. It provides everything CIOs need to know to implement a sustainable foundation to create business growth through mobile applications.

What Are the Main Benefits of Deploying Mobile Applications?

Despite initial fears that the spread of mobile technologies would spiral costs out of control and put sensitive corporate data at risk, companies are increasingly looking to align available information communications technology (ICT) assets with strategies for business growth. In particular, they are looking to mobile applications to offer incremental business benefits that together can have a transformative impact (see Exhibit 2).

Exhibit 2: Companies Are Looking for Both Internal and Customer-Facing Benefits From Their Mobility Initiatives
Source: Yankee Group's 2011 US Enterprise Mobility: IT Decision-Maker Survey, Q1-Q2, and 2011 European Enterprise Mobility: IT Decision-Maker Survey, Q2

Activities Driving Investments in Mobility Solutions	% of Respondents Who Ranked as Most Important
Improving responsiveness to customers	48%
Providing mobile access to existing applications to improve worker productivity	41%
Transforming business processes to improve operational efficiencies	30%
Providing mobile technologies to improve work-life balance for employees	19%
Fostering collaboration with customers and partners	17%
Fostering worker-to-worker collaboration	15%
Supporting employee-purchased mobile devices for business purposes	8%
Other	1%

In addition to these specific activities, investments in mobile solutions are also seen to have a number of other more generic benefits, including:

- **Improving staff retention.** When companies provide their employees with the right technologies, specifically mobile and collaboration tools that help them work effectively, they respond with increased loyalty. This not only leads to a more satisfied and productive workforce, but it can dramatically reduce staff retention and acquisition costs.

- **Enhancing brand image.** From improving customer service delivery and providing a more compelling technology environment for current and potential employees to creating more direct customer-facing mobile retail and service application opportunities, the mobile device is an increasingly important touchpoint for brands to engage with their customers.

Because of these benefits, mobility is now considered an essential enterprise capability. Its importance is evidenced in Yankee Group's 2011 US Enterprise Mobility: IT Decision-Maker Survey, Q1-Q2, which shows that even among companies that are reducing their overall technology investments in 2011 due to the weak economic outlook, more than a quarter are still increasing spending on mobile technologies, such as smartphones, and on mobile applications (see Exhibit 3).

Exhibit 3: Companies Planning to Decrease Technology Spending Still Plan to Spend on Mobile
Source: Yankee Group's 2011 US Enterprise Mobility: IT Decision-Maker Survey, Q1-Q2, and 2011 European Enterprise Mobility: IT Decision-Maker Survey, Q2

Companies increasing overall technology investments in 2011		Companies decreasing overall technology investments in 2011	
Top 5 areas of increasing expenditure	**Top 5 areas of decreasing expenditure**	**Top 5 areas of increasing expenditure**	**Top 5 areas of decreasing expenditure**
User hardware, e.g., mobile devices (34%)	Office hardware, e.g., printers (38%)	Mobile applications (29%)	Office hardware, e.g., printers (33%)
User hardware, e.g., laptops, computers (33%)	User software, e.g., MS Office, MS Windows (18%)	User hardware, e.g., mobile devices (26%)	User hardware, e.g., laptops, computers (25%)
Mobile applications (28%)	LAN infrastructure equipment, e.g., WLANs, PBXs (17%)	User hardware, e.g., laptops, computers (18%)	Data center equipment, e.g., servers (19%)
Data center equipment, e.g., servers (22%)	Data center equipment, e.g., servers (16%)	Data center equipment, e.g., servers (14%)	Enterprise applications (14%)
Enterprise applications (19%)	WAN infrastructure, e.g., networking equipment (12%)	Enterprise applications (14%)	User software, e.g., MS Office, MS Windows (12%)

What Do We Need to Think About Before Getting Started?

Most of today's large businesses deploy mobility in an opportunistic fashion, using mobile technologies that address a specific set of workers or a specific business application. Many of these initiatives yield benefits to the organization. However, they are often limited in scope and not scalable. The following are some characteristics and limitations of opportunistic mobility:

- Point solutions address one specific application or business need, and in many cases are a bandage approach to mobility—a solution is rapidly applied to enable one specific application need (e.g., wireless e-mail access).

- These specific solutions don't consider the broader mobility requirements within an organization.

- Projects are initiated before policies are established, and administrative and management tools to enforce policy are limited or nonexistent.

Opportunistic mobility initiatives are not entirely bad. In fact, they demonstrate the value of mobile and wireless technologies for users and decision-makers, acting as a proof of concept. They also can reveal the policy and management issues IT must deal with more formally as mobility projects expand, and they can form a basis for managing these issues.

The first step to creating a more integrated approach is for businesses to understand how mobility is critical to their success today and in the future. This mobility assessment must consider the full scope of employees, assets and business processes. From there, executive management, finance, IT, affected line-of-business leaders and end-users can establish policies.

A company is on the right track toward strategic mobility when its mobility initiatives take on the following characteristics:

- **The key focus is on specific business processes that will benefit most strongly from mobilization.** This has to be the starting point if companies are to actualize the full potential of mobility for business transformation.

- **Individual mobile projects "plug in" to a common management and security infrastructure.** Mobility is driven by policy rather than by ad hoc end-user pull.

- **Projects can be supported and management and security policies can be enforced.** This is regardless of the type of network used (public or private, wired or wireless), the application accessed or the device used.

- **A broader set of technologies and mobile tools is considered a "mobility package" for end-users.** This includes integration and coordination of voice, data and remote access services.

- **Common middleware, software and security architectures exist.** These can be leveraged across different mobility services within an organization.

How Do We Decide Which Applications to Deploy?

Mobile applications in businesses have been around for a long time. Typically, they were either sales force or field force automation applications designed for companies in vertical industries with large and dedicated remote workforces. Before the wider workforce became mobile, these were the most widely deployed mobile enterprise applications. However, with the advent of smartphones and tablets, as well as the increasing mobility of a more diverse range of worker roles, internal business process and collaboration applications have come to the forefront as companies look to mobility to provide productivity benefits (see Exhibit 4).

Exhibit 4: Enterprises Look to Deploy a Range of Mobile Enterprise Applications on Smartphones
Source: Yankee Group's 2011 US Enterprise Mobility: IT Decision-Maker Survey, Q1-Q2, and 2011 European Enterprise Mobility: IT Decision-Maker Survey, Q2

	Already deployed	Plan to deploy in 24 months	No plans to deploy
E-mail and PIM access	89%	6%	5%
Access to corporate database	36%	30%	34%
Intranet/employee Web-facing portal	34%	25%	41%
Stand-alone corporate instant messaging	27%	19%	54%
Stand-alone Web conferencing	22%	25%	53%
Dispatch/work order management	22%	17%	61%
Enterprise social networking	18%	18%	65%
ERP/inventory and financial management	17%	19%	64%
Unified communications	13%	34%	53%
Sales force automation	14%	21%	65%

As smartphones and tablets continue to proliferate among consumers and mobility continues to pervade the enterprise, the focus for mobility initiatives diversifies, with over a third of all companies prioritizing directly customer-facing applications as they mobilize either customer service or marketing-related activities (see Exhibit 5).

Exhibit 5: Enterprises Consider Customer-Facing Mobilization Vital Over the Next Two Years
Source: Yankee Group's 2011 US Enterprise Mobility: IT Decision-Maker Survey, Q1-Q2, and 2011 European Enterprise Mobility: IT Decision-Maker Survey, Q2

	Percent of companies identifying activity as first-ranked choice for mobilization in the next two years	Percent of companies identifying activity as second-ranked choice for mobilization in the next two years
Customer-facing service activities	27%	29%
General internal business processes	26%	23%
Field and sales force business processes	27%	20%
Customer-facing marketing activities	12%	11%
None of these	8%	1%

Ultimately, the decision of which applications to mobilize first will be determined by how the enterprise wants mobility to contribute to strategic or tactical goals. However, the following framework helps prioritize the focus for companies when making investments in mobility solutions:

- **How will you measure success?** A successful application will be one that provides measurable benefits. These will vary but could manifest in measurable productivity gains, staff engagement, new customer business or rationalized infrastructure. Applications that can tie back to measurable KPIs should be prioritized.

- **What integration, if any, needs to occur with back-end IT systems?** In addition to sales force and field force automation applications, there is growing interest in business intelligence applications that give information workers access to real-time data and operational applications addressing, for example, stock, order and supply chain management. The latter typically require deeper integration into back-end IT systems that will be a key determinant of the platform being used and the type of applications being deployed on that platform.

- **How many users are being targeted?** Clearly the scale of the implementation is a key factor determining how an application is deployed and the cost of deploying and supporting it. The degree to which this is an acceptable cost inevitably depends on the anticipated strategic benefits of the implementation.

- **Are the targeted business processes B2B, B2E, E2E or B2C?** Identifying which processes have a business-to-business (B2B), business-to-employee (B2E), employee-to-employee (E2E) or business-to-consumer (B2C) orientation lays the foundation for more specific considerations on user roles and application types.

- **Is the process transactional, informational or collaborative?** In tandem with identifying the target audience, it is important to establish the exact use case in the contact zone between these end-users. For example, a B2E mobile app might need to fulfill one or all of the following: relay information to employees, transact a particular process such as an expense form approval, or provide access to collaborative tools such as wikis and portals.

- **How mobile are the user roles identified for deployments?** The right combination of device and application features and, crucially, the policy management governing the application solution will be strongly determined by the degree to which the worker being targeted is mobile. While applications can have transactional, informational and collaborative capabilities, the extent to which the end-user is mobile will determine his or her mix in the final solution.

How Do We Make Sure Applications Fit Our Specific Requirements?

Once the exact use case has been identified, there are a number of mobile application types that need to be matched to the particular use case. There are four models of application development and deployment, each of which will likely be optimal for different use cases within the business. Indeed the optimal solution for the CIO is to have a platform that provides as much of the flexibility to facilitate all of these ways of deploying applications as possible:

- **Purely customized development and deployment:** These downloadable apps are customized for specific business objectives, but they lack the agility and pace of standardized development and deployment.

- **Prebuilt and off-the-shelf:** These downloadable apps provide quick deployment and task-oriented applications but lack the close and customized alignment with business processes.

- **Modifiable templates:** As enterprises look to more closely align mobile apps with specific business processes, there has been a change in direction among vendors. Increasingly platforms are pursuing a middle-road solution attempting to offer downloadable apps with a combination of flexibility, customization and speed in design and deployment.

- **Web-based/HTML5:** Rather than being downloaded onto the device or via an application store as a piece of software, Web-based apps are more akin to a Web site designed specifically for a mobile device.

The pros and cons of each need to be carefully considered before selecting the right development model for specific deployments (see Exhibit 6).

Exhibit 6: Different Application Types Suit Different Use Cases
Source: Yankee Group, 2011

Custom-built apps		Prepackaged apps		Modifiable templated apps		Web-based apps	
Pros	**Cons**	**Pros**	**Cons**	**Pros**	**Cons**	**Pros**	**Cons**
Common foundation for multiple-app deployment	Built from scratch, so small or no apps library	Pre-built, task-focused apps	Weaker on integration, management and security	Reduced design and deployment time	Some limitations on what can be modified	OS-agnostic, working across devices and browsers	Optimal performance requires constant connectivity
High degree of control over management and policy	Business process- but not necessarily UI-led	Quick development and deployment	More challenging compatibility with wider mobile strategy	Blend of customization and prebuilt	Emerging paradigm, not available from all app platforms	Developer momentum likely to build behind HTML5 development framework	Slower to access through a browser and URL rather than a one-click icon
Custom-built for specific business objectives	Higher operational costs to maintain infrastructure	Strong UI, adoption from all audiences	Not necessarily OS-agnostic	Holistic but no binding solution		Future development likely to address current obstacles, e.g., providing an offline mode	Weaker integration with device-specific features such as the processor, camera, accelerator
Tight and customized integration with back-end systems	A lot of effort required in the integration layer	Development efforts more closely tied to ROI	Difficult to justify payroll for in-house developer			Open-source and patent-free widens options to partner with developers	

What Architecture Do We Need in Place to Support Mobile Applications?

For any company deploying mobile applications to its workforce, deciding on the use case and application model is only half the story. The expected value from app deployments will only be reaped if the right mobile application management capability is in place to assert policies around the distribution, securing and maintenance of those applications in the field. The integration of the application management solution and the app development platform is crucial.

Mobile Application Distribution

One of the critical parts in the implementation chain is simply making sure the right mobile applications get distributed to the right employee. A mobile application management solution can determine policies to guide this distribution based on whether the application is internally developed or externally sourced and based on employees' roles, devices, location and when they should have access to the application. It is also crucial to ensure that the right version of the application is being deployed. By pushing the apps directly to end-users' mobile devices, it is possible to minimize the configuration burden on users and cut the amount of time they would otherwise have to spend on locating and downloading it from an app store or marketplace themselves.

Mobile Application Security

Mobile devices, whether smartphones, tablet PCs, netbooks or laptops, operate in public places on open networks. These dynamics create the need for a layered security approach that protects the device, the app and the data flowing in between. There are a number of ways to assert content and application management. Encrypting data at rest and data in transit is a critical layer in the security architecture that all enterprises must build. Techniques such as MAC/IP filtering and monitoring are also needed to protect the integrity and authenticity of a message by allowing IT to identify the MAC addresses of devices and allowing only a pre-approved list of devices to get onto the network. Measures such as token, certificate and on-demand user authentication and application-level security are also critical. The possible responses to any policy breach can include measures such as the remote disabling of corporate-owned devices (or of the app so it can no longer be used on the device), the wiping of data from both app and device, or sending alerts to the device notifying the user of actions that need to be taken.

Mobile Application Maintenance

Distributing and securing a mobile app needs to be complemented by ongoing maintenance and administration to ensure quality and security in the overall experience and to protect the value of the initial investment. This essentially includes remotely updating the app and monitoring its usage. Ensuring the right version of the application is deployed to the right devices with access control policies enabling the seamless transfer of access as users change devices is crucial to support an uninterrupted experience and the integrity of any workflow the app has mobilized. Monitoring each application life cycle on each device is also critical to ensure that the correct licensing is being adhered to and that ongoing feature enhancements are made to the app. A centralized portal for administrator access will allow IT departments to undertake these activities.

Are the Benefits Worth the Cost?

Clearly, prioritizing the right use cases and ensuring there is a platform that can support the required applications need to be very clearly set in the context of the project's associated costs versus anticipated benefits. The benefits are clearly dictated by the broader strategic goals of the company in deciding on specific applications to mobilize and specific KPIs to measure their success. While these will vary case by case, the upfront and recurring costs are easier to measure.

Cost management is made substantially easier by investing in an application platform that can integrate a lot of the functionality required for mobilization projects, and consequently, it provides a more cost-effective end-to-end solution than the contracting of separate solutions.

Initial Costs

- **Device costs:** Increasingly, employees are bringing their own devices into the office and expecting to use them for work purposes. However, the CIO and line-of-business heads need to ensure the device can support what the application is designed to achieve and provide a strong enough user experience to ensure adoption and continued usage among the target audience. This may require purchasing and distributing devices to support applications.

- **Application development:** For applications that require complete or some customization, there will inevitably be costs associated with developing the application to suit the specific business requirements.

- **Systems integration:** The costs depend on the complexity of the application and therefore on the amount and type of information it is required to capture or draw down from legacy back-end IT systems. The back-end integration is unlikely to be the sexiest part of any application deployment, but it is nevertheless key to enabling flexibility, including the portability of apps across different devices. Investing time in ensuring the right integration work is done is crucial to the supportability of the application. Fortunately, several app platforms are moving from simply allowing a broad range of adapters into back-end systems to the modularization of connections for agile app deployment and reusable code components or code-free development. This makes the development, integration and supportability of apps more sustainable going forward.

- **Testing:** Whether or not an application is tested sufficiently can make or break any implementation. Money spent on device management solutions to ensure applications will be supported and can be maintained on the devices they are being deployed on is money well spent.

- **Training:** Making sure the right technical components are in place is one thing; ensuring that a live deployment runs smoothly is another. Providing adequate training for end-users is absolutely crucial not only to optimize on the functionality of the application, but also to engage users.

Recurring Costs

- **Maintenance:** Every application needs to be maintained once it has been deployed. This is likely to involve a number of elements, but the associated costs will be determined largely by the frequency of new version releases and updates and the costs of supporting the fleet of devices supporting the application.

- **Connectivity:** All applications require different amounts of data processing to function. Ensuring users are on the right data plan to match their application usage is key to avoiding spiraling costs.

Five Principles to Lay the Foundation for Enterprise Mobile Application Success

For many enterprises, the technical and infrastructural challenges of launching mobile applications may seem daunting. However, the biggest challenge for most is to establish the right mindset in the first place to lay the foundation for a sustainable, responsive and flexible mobile enterprise capability. This will greatly enhance any implementation. The following principles will help enterprises lay the right foundation for any application mobilization program.

1. Lay a mobile foundation.

Start with mobile in mind. Deploying applications on mobile devices requires a fundamentally different mindset than just mobilizing existing desktop or paper-based processes. Any successful mobile application deployment will start with a rethinking of the actual business process being mobilized and its relationship with adjacent processes.

2. Think agnostic.

Agnosticism should be in the DNA of any strategy. Building a long-term and sustainable mobile application capability will require applications to be agnostic of the different OSs supported, of the platform on which apps are developed and of the back-end systems they utilize. While OS-specific solutions may be appropriate for very tightly defined user roles and use cases, more generally deployed OS solutions that don't interoperate incur higher costs for support, development and maintenance. As mobilization continues apace in the enterprise, IT will increasingly look to draw from multiple app libraries—consumer, enterprise and cloud-originated—to cater to a broadening base of mobile employees who want to access applications and a broader range of business processes falling under the scope of mobility initiatives. Consider Web applications and SaaS solutions as ways to make implementations easier and less investment-intensive.

3. Focus on the UX.

Ensure the user experience for critical enterprise apps is as good as that for consumer apps. IT departments need to invest in developing an interface that not only provides the necessary functionalities but also makes applications easy and acceptable enough for employees accustomed to seamless and well-integrated consumer apps.

4. Build in security from the start.

The mobile workforce presents a huge opportunity but also a number of risks to the security of sensitive corporate data and of the handsets themselves, as well as the management of voice and data costs. Carefully consider the degree and type of security required and make sure there are contingencies in place to handle a security breach if it occurs.

5. Think about where social adds the most value.

The enterprise social network is no longer a nascent part of the ecosystem, as specialist players gain traction and existing platforms integrate increasingly social features. As platform capabilities converge, the social dimension is increasingly used to bind platforms together into a sticky proposition. Consider how social features will add the best value to your mobile applications.

A 10-Step Toolkit for CIOs to Mobilize Enterprise Applications

Deploying mobile applications can be a complicated endeavor and, if not implemented in the right way, a costly investment. In addition to the substantive decisions that need to be made around the use case, application type and ongoing management of applications, it is crucial to instigate the right process to lay the foundation. The following step-by-step guide takes CIOs through the project cycle, from the start to the finish of any implementation.

Step 1: Define the goal.

Any application mobilization project must start with the intended goal, be it strategic or tactical. Central to this is identifying the specific and adjacent business processes that will be impacted by the application deployment and the measurable benefits you expect to achieve. This will also involve identification of the end-user employees the application is targeting and those whose role will either change or be redundant subsequent to the implementation.

Step 2: Choose the right ecosystem.

Although agnosticism and the ability for apps to port across rival platform environments will grow, complete interoperability across the enterprise application landscape is unlikely to emerge. As IT departments move from supporting one vendor to supporting a more federated and loosely integrated environment of operators, application vendors and systems integrators, it is important to identify the most vibrant ecosystem delivering relevance for your enterprise needs. Applications come in different shapes and sizes. There may be a need for each type, so be sure to invest in a platform capability that enables flexibility and can provide the right back-end integration fit.

Step 3: Consider your distribution requirements.

Even early on in the application mobilization experience, planning how to future-proof your distribution strategy will set solid foundations for quick scalability later on. Deployment mechanisms such as enterprise application marketplaces and storefronts are becoming more commonplace. Having even a preliminary road map for the types of future mobile application requirements and the scale of deployment to different user profiles will allow you to identify the most likely distribution strategy needed.

Step 4: Design/build.

With the right platform in place it is time to design and build the application. While OS agnosticism is important for general deployments, hardware still matters. Smartphones, laptops, ruggedized PDAs and tablets each present a different combination of form factors, features and capabilities. The chosen device clearly needs to support the application being deployed and the environment in which the mobile worker is using it. Providing the right overall user experience is of paramount importance to ensure engagement and usage by the mobile workers in question. Engaging those with experience in previous mobility initiatives will be very important to understand previous lessons learned.

Step 5: Train.

It is imperative to make sure that all intended end-users have the requisite training on the functionality of the device and application and that they understand the mobilized business process. Being able to use the application but not understanding the new workflow may result in the loss of intended productivity gains.

Step 6: Start small, test, feedback.

Start with a small deployment and work to engage a sample of the target audience. If the test audience is not engaged with the process and the intended outcome, the project will always struggle to succeed.

Step 7: Measure.

With the application running in the field, revisit the KPIs against which you prioritized your deployment and evaluate whether it has delivered on the anticipated benefits. It will be important to evaluate the qualitative feedback from the sample audience to understand their perspective on what worked and what did not and the degree to which they see it as a sustainable and desirable change in process going forward.

Step 8: Scale.

If needed, iterate the deployment to fix any problems and scale the redeployment once you are satisfied all the issues have been ironed out. Carefully monitor the fully scaled deployment to ensure no problems arise.

Step 9: Support.

Ensure there is clarity over the assistance available to end-users in case they encounter difficulties in the operation or usability of the application, and create transparency around any new product revisions or updates.

Step 10: Start again.

The type and variety of business processes for which mobile applications will be relevant in the future is only likely to be limited by your imagination, and others will similarly be looking to gain competitive advantage. After initial deployments are made, use the lessons learned to plan your next project.

About the Author

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Chris Marsh is a senior analyst with Yankee Group's Enterprise Research group. Marsh focuses on analyzing opportunities for enterprises around mobile applications, unified communications and 3G and 4G wireless services. Of particular interest is the transformative nature of these technologies on enterprise and service provider business models.

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