Opinion Paper

Next Generation Mobile Application Management

Strategies for Leveraging Mobile Applications Within the Enterprise

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1 Executive Summary

Mobile applications are ubiquitous right now and it is not easy to elude the hype generated by the latest generation of mobile phones and tablets. While enterprises led the way to the wide adoption of smartphones with push e-mail and collaboration features many years ago, they fall behind when it comes to introducing mobile applications that will optimize their business processes. In this way, they are not utilizing the new technologies to their full potential. Right now, it is the consumer market that primarily dominates the mobile application space. According to market analyses by leading analysts and trends we see at our customers and partners, this is about to change in 2011.

But this development is not only evolving around the next generation of smartphones purchased by enterprises. According to a study conveyed by CITRIX, 80% of the participants are willing to buy a private iPad and use it for business purposes. The same study states that 84% of businesses surveyed would support the use of personal iPads for business purposes. Gartner also recommends that CEOs ask their marketing and product development teams to present a creative briefing as soon as possible, detailing how iPads could be used within the company and by its competitors, because the iPad has the potential to be highly disruptive to the business models and markets of many enterprises.

During the last twelve months, we have seen some very clever solutions but also projects that turned out to be a complete waste of money and resources. If your organization is thinking about mobile applications and how to start a successful mobile application initiative, you will find some answers in this paper.

Based on our application lifecycle management offerings, we have developed a specific lifecycle management framework for mobile applications. We are continuously updating this framework in order to keep up with the latest development in this field, which is one of the fastest moving areas in the ICT space. In this paper, we will provide an insight into the status quo of mobile application management for enterprise IT organizations. Along with real life examples you will read about a proven methodology to set up a mobile application strategy and best practices on how to manage the lifecycle of your mobile applications.
2 Why Should Enterprises Care About Mobile Applications?

Never has such an enormous amount of mobile computing power been as affordable and usable as today. Everything seems to be in place, beginning from highly intuitive user interfaces, vibrant eco-systems, and last but not least a mature and reliable infrastructure to send and receive data called the mobile Internet. From the enterprise's point of view the question is: What is in mobile business applications for the enterprise and how can an enterprise create real value out of this trend?

Since the introduction of the iPhone in January 2007 and the iPhone SDK in February 2008, the consumer market for mobile applications has changed completely and the term “app” was coined for consumers to describe an attractive and smart application for a specific purpose, running on an Internet-connected smartphone. This changed the mobile user experience for a large number of consumers and generated huge market opportunities. More and more devices in a variety of different form factors are introduced every day, and they are bringing even more computing power and richer experiences into the hands of their users.

Despite the fact that these fundamental changes for consumers are rather recent ones, the concepts behind enterprise mobile applications are more mature. Detecon, for instance, has already developed a management framework for mobile applications based on our application portfolio and lifecycle management offerings. However, the new generation of devices raises a lot of questions on how we will do our work in the future and which impact they will have on the enterprise application landscape.

IT managers around the world see themselves faced with two new trends in their organizations. First of all, many early adopters, among them even executives, sneak their new devices into the enterprise and thus confront the IT managers with a whole new set of issues, beginning from data security and privacy concerns all the way to answering support calls for devices and software never approved to be operated inside the corporate network. There are many ways of dealing with this new situation, ranging from banning the use of private devices to letting everyone bring their own hardware into the workplace and even providing active support from the IT department. The task of working out the right policy is quite complex and very specific to the nature of the business; these issues are not addressed in this paper.

Regardless of the policies and how they are implemented, mobile applications also provide new opportunities for the business. Once the users of the organization get used to having all the information they need right in their palms, the expectations regarding the business applications start to rise. It is quite tempting to jump on the bandwagon and start to build cool, mobile versions of existing applications. As a matter of fact, many enterprises started similar projects and found out that these did not necessarily lead to the anticipated business value. In this document we will examine opportunities and challenges regarding mobile apps and provide insight on how some organizations successfully leveraged them.
3 Which Applications Should be “Mobilized”?

The first step towards a successful mobile application strategy is the identification of the specific business processes that would benefit significantly from being “mobilized”. The key here is a much more context-aware application available at the time and place it is needed. Almost every modern smartphone is capable of GPS positioning and is able to connect to Bluetooth peripheral equipment (i.e. printers, sensors, etc.).

Here is an example of how the city of Bonn benefits from a mobile solution in order to reduce process costs and increase citizen satisfaction. Previously, the traffic wardens of the city carried a mobile device for the manual recording of parking violations. At the end of the day, the devices were synchronized to the servers of the city of Bonn and in this way parking tickets were generated and then sent out to the car holders via mail. This process was quite expensive for the city, and especially in the case of smaller violations the process costs could end up being higher than the amount of the ticket itself. In addition to that, whenever a car holder called the city with questions regarding a ticket they found on their car, the city was not able to answer any questions before the ticket was generated as a record, which could take days.

The new solution developed by the city of Bonn shows how the mobile context and the capabilities of standard smartphones can be leveraged in a clever way. First of all, the new solution was built on top of the BlackBerry mobile platform, which includes real-time data synchronization services. A couple of seconds after the traffic warden issues the parking ticket, the record is already available in the systems of the city and can be accessed by call centre agents. So whenever somebody calls the city with questions or complaints about a parking ticket found on their car, the agents are able to give detailed information about the case right away. Evidence gathering is much easier now.
easier with the built-in camera and GPS data that can be attached to the photos. In addition to that, the traffic wardens of the city are able to print much more detailed parking tickets with specific information about the violation and the data needed for the payment (e.g. the record number). It turned out that 40% of the car holders pay the tickets before receiving any further notification by mail from the city, which equals to significant cost reduction for 40% of all parking tickets issued by the city of Bonn.

The example above shows how the mobile context can be used to increase value by optimizing a mobile process that is already in place. In the specific situation of an enterprise, the question is where to start and how to manage a mobile application portfolio.

At this stage it is necessary to have a management framework for mobile applications. Based on our application portfolio management, we have developed such a framework that includes tools and best practices for defining the mobile application strategy, managing the mobile application portfolio, and lifecycle management for each application.

The first step is the definition of the mobile application strategy as a long-term plan for mobile activities in order to leverage mobile technology for the organization’s long-term success. This involves the definition of a strategic vision or mission as well as objectives and directions for mobile apps and services. This also includes design principles, compliance with relevant standards and regulatory, governance structures, investments, and vendor strategy. The mobile applications strategy will be the foundation for the mobile application portfolio and for the specific make-or-buy decision for each application.

Once the goal is set by the mobile application strategy, the next step is to build a mobile application portfolio based on the mobile strategy. One way to build the portfolio is the identification of business functions and processes that will primarily benefit from a mobile solution and those creating significant value for the customers. Without a holistic view of all processes within the organization, this could end up being quite a challenge, especially in large organizations.
Another approach to finding candidates for a mobile application is the categorization of mobile workers regarding their mobility. Such a categorization, as for instance introduced by Nokia’s "Star Project", helps to understand the types of applications employees use in order to carry out their daily tasks. The main factors for such a categorization could be the frequency of changing location and the number of locations where a mobile worker carries out tasks.

A detailed analysis of employees with a high degree of mobile tasks should lead to a set of processes and subprocesses that could be improved by mobile applications. In a second step the possible applications are revised regarding their business value and how they would benefit from a mobile solution. This step should also take into account that many enterprise software vendors already provide or have announced mobile clients for their applications, which leads us to expect more future investments in the mobile space by traditional software vendors.

If the identified processes require only a few specific business applications, it is very likely that the users’ needs can be satisfied by purchasing the mobile clients from the vendors of those business applications. However, if data is needed from many different backend applications and/or the mobilized process has a high business value, it is worth considering in-house development for the application. Regardless of the make-or-buy decision, each mobile application within the portfolio has to be managed throughout its lifecycle.
4 Mobile Application Lifecycle

Application Lifecycle Management (ALM) is not new and there are quite a few approaches to manage the lifecycle of applications. As a matter of fact, Detecon has already developed an application lifecycle management framework comprising five phases which span the entire application lifecycle.

In most cases, this ALM framework can easily be applied to mobile applications. In each phase, however, there are certain specific considerations and challenges that come with mobile applications and their lifecycle management. The following sections of this chapter will look into the specific challenges and issues of each phase regarding mobile applications.
4.1 Plan: Choosing the Right Platform

The current situation is somewhat similar to the client/server market in the late 80s and early 90s. Previous to the rise of Internet software and Web-based user interfaces, vendors and enterprise developers had to decide which client operating systems they would support, knowing that the development costs would nearly be multiplied by the number of supported operating systems. Many cross platform development frameworks tried to solve the problem but never really took off due to the massive differences between the platforms. Finally, the dominance of Microsoft Windows solved the issue by setting the de facto standard for client operating systems.

![Worldwide Smartphone Market Share](image)

Source: Gartner

Right now, we are pretty much facing the same situation in the mobile market, except that there is not yet a clearly dominating mobile platform to develop for. According to Gartner\(^1\), the worldwide smartphone market is almost completely divided up between four different vendors, each having a significant market share. In addition to that, it is not likely that we will see a clear, dominating winner in the mobile space anytime soon. So, in a worst-case scenario, an application has to be rewritten four times with virtually no code re-usage in order to cover the market. We believe that the recent announcement of Nokia and Microsoft will soon convert the Symbian market share into a Windows Phone market share of almost the same size. It seems that three major mobile platforms (iOS, Android and Windows Phone) will dominate the mobile platform market.

The fragmented mobile market is a significant barrier if the enterprise can not control the client environment. For example, an insurance company wants to provide mobile services to their sales representatives but also to independent sales agents for evaluating the customer risks and creating specific health insurance offers. Right now, many insurance companies

\(^1\) Gartner share of worldwide 2010 Q3 smartphone sales to end users by operating system
provide the sales agents with specific client applications or websites, which are used both by internal staff and independent sales agents. Since the insurance company cannot control the devices that will be used by the independent agents, it represents quite a challenge to design a solution that is suitable for the majority of users. Sometimes it might even be less expensive to supply every independent agent with a mobile device than to provide the service for all available platforms.

In order to address this issue, some software vendors provide cross-platform mobile application development frameworks. These frameworks either have their own runtime environment, which is available on all supported mobile platforms, or they generate native applications from an intermediate code. Before using one of these cross-platform frameworks, we strongly recommend an intensive evaluation of the current and future capabilities needed for the mobile application and how they are supported by the framework. By nature, a cross-platform framework is the least common denominator of all supported platforms, and this fact will limit the application itself. As soon as the application grows complex, the cross-platform frameworks may fail to provide the same freedom as native application development. In particular if access to special features of the devices was needed (3D graphics, GPS, sensors, Bluetooth devices, etc.) the early versions of the cross-platform development environments turned out to be very limiting. The recent cross-platform development environments however caught up regarding many of these limitations but are still one step behind the native development kits.

If the application is not that complex and does not require special features, it is worthwhile to consider building a Web application optimized for mobile devices instead of cross-platform development frameworks. However, the limitations of a mobile Web application are likely to be even greater. In addition to that, the differences between mobile browsers are more significant than in the desktop space. Nevertheless, mobile Web applications are a good alternative for opening an existing Web application to a mobile user base. There are several advantages that make mobile Web applications a viable alternative to native applications. First of all, no new set of skills is needed to put the application online. An in-house Web application can be optimized for mobile devices with internal resources. Most Webkit-based browsers (e.g. iOS or Android) do quite a good job, even if the Web application is not optimized for mobile devices. The mobile Web application can achieve a look and feel close to the native applications if its design is optimized for mobile browsers. This is an easy and cost-effective way to reach a large number of mobile users if an enterprise can cope with the limitations involved.

Sometimes other factors may limit the platform decision. For instance, a vendor of a blood glucose measurement device wants to create an application for keeping track of the measurements and insulin injections. The variety of different handsets, which all bring their own proprietary hardware interfaces, makes it almost impossible to create hardware that is compatible with more than one type of device. In this case, the vendor decided to solely implement the hardware for the Apple iPhone. This is the only device that has enough reach to customers and brings only one type of connector for external devices. Even though the company can only address a fraction of the smartphone market, this fraction is still big enough target and worth the effort because of its homogeneity.

This example shows that as soon as the application needs access to hardware that is not included in the consumer devices, the platform options are likely to be limited to one platform.
The platform decision is much easier if the client devices are also controlled and/or limited from the beginning. We believe that in most enterprises this is the case, since the mobile devices are purchased and managed by the enterprise\(^2\). In this case several other considerations might also influence the decision:

- Enterprises have strong requirements regarding device management and security. The time it takes to put a new device into operation and how secure it is are major factors that should be considered during the platform decision.

- According to mobile application vendors, the availability of mobile development know-how is the biggest challenge they are facing. We consider this to be an even bigger challenge for other enterprises. And this holds even more true for proprietary technologies like Apple's Objective-C/Cocoa. It currently seems to be impossible to find developers with iOS know-how. Enterprises with Java know-how within their IT organization are more comfortable using the BlackBerry or Android platform, since it is easier for them to train their staff on specific issues regarding mobile application development instead of starting to learn a new language. According to development managers we talked to, iOS generally seems to be more challenging for developers than other mobile platforms.

- The amount of additional services provided by the platform, which support the development of enterprise mobile applications, can have a major impact on development costs. The need for services like push notifications, data synchronization or support for SOAP-based enterprise Web services and how they are supported by the platform should be carefully evaluated during the decision process.

- In most cases, enterprise mobile apps rely on data and business logic from existing enterprise applications. The integration of mobile apps into the enterprise application landscape may also result in impacts on existing applications. The mobile application has to be integrated into an overall picture, including existing applications and how they are accessed by the mobile app. This might also lead to some changes regarding the existing infrastructure in order to provide access to enterprise data.

- It is crucial to have good support from the platform vendor. While vendors like RIM provide a fairly good support and dedicated contact persons, other new entrants to the market (i.e. Apple) are still ramping up their support organizations for enterprise customers outside the U.S. This is one of the weakest points of Android for enterprise customers. There is no single entity that is responsible for the entire platform including the device. While enterprises are likely to get some support from the device manufacturer, we assume that it will not be easy to get support for the entire platform including the core OS from one single entity.

\(^2\) We expect that this situation will change for many enterprises soon. We believe that most enterprises will face a heterogenous mobile device landscape in the near future.
4.2  Build or Source: Prepare for Fast Cycles

According to a recent IDC study, businesses are increasingly taking a multi-platform approach. Most participants of the study are planning to deploy apps on at least four different devices (e.g. iPhone, iPad, Android Phone, Android Tablet) in 2011, which would result in an increase of 100% for this year.

While enterprise applications and infrastructure are mature and have long life cycles, the major mobile platforms are still new with remarkably short innovation cycles. Apple alone adds around 1,000 new capabilities to iOS every year. If an organization had wanted to develop and maintain an application for three major smartphone platforms, it would have ended up facing over 30 major and minor updates over the last two years.

Enterprises should expect much shorter update cycles and in general shorter lifecycles for their mobile applications, which may lead to more agile lifecycle management approaches and even organizational changes within the IT. The same IDC study as quoted above also states that 81% of the respondents intend to insource their development again to build integrated Web and mobile development teams.

As mentioned above, the modern mobile platforms are relatively new and fast moving. Later on we will further discuss how difficult it currently is to find the skills needed to develop compelling mobile applications. In-house development of mobile applications should be considered if the organization already has significant development know-how, the mobile application is intended to be of high value for the business, and if it requires very specific and rare domain knowledge. Another reason for in-house development might be the fact that the mobile app is aimed to be a major differentiator and/or innovation to the market.

If the necessary skills are not available in-house, it might currently also not be easy to find partners for outsourcing the development of the application, either. The required skills are more likely to be found in smaller system integrators and even Web agencies rather than in large system integrators. Many enterprises we talked to are facing new contractors with no track record inside the company.
4.3 Implement: Focus on Agile Development and User Experience

Short update cycles as those shown in the graphic above require adequate development processes for the IT organization. Regardless of whether the development is outsourced or kept in-house, businesses entering this field will need profound skills in agile software development processes, such as Scrum, in addition to a deep understanding of issues specific to mobile applications (platform specific issues, latency, data synchronization over the air, etc.). In the following passage we will describe an example that shows why enterprises need to learn more about the specific nature of mobile applications.

When a company was designing a mobile app for accessing business data, the first screen they designed was a login screen for the user to put in the required credentials (i.e. username and password). Having specified many Web applications for the enterprise, this seems to be the first thing you do, right? It turns out, however, that first of all, a mobile device is a much more personal device than a PC, for instance, and it is rarely shared. In addition to that, modern mobile devices have much more secure and sophisticated capabilities for authentication than a login screen. Last but not least, the users got annoyed by the login screen, not being used to the procedure based on their overall experience with mobile apps. In the end, the login screen was completely removed from the application.

Due to Apple’s influence on the smartphone market, we observed a mind shift among users of smartphones during the last years. Aesthetically designed and intuitive user interfaces are status quo rather than a nice-to-have feature. Even business users who are used to enterprise applications have much higher expectations when it comes to mobile applications. But why should enterprises pay the extra costs for UI design? Beyond user acceptance and joy of use, we found that paying extra for UI might be worth the avoidance of extra efforts in user training and support calls. The most successful mobile apps focus on those few features that are most important for the users and they succeed in making them as easy to use as possible.

Last but not least, we see necessary changes within the IT organization to make agile development work. Large IT departments tend to separate different roles into different organizational units (for example demand management, project management, architecture, delivery/development, etc.). We have observed many different issues when these types of organizations tried to deliver agile projects, especially in the mobile space. Having small mixed teams focused on one application seems to work much better in this scenario. Even if the development is outsourced, the IT organization must be able to take an active role within agile development to ensure that the business goals are achieved.
4.4 Operate

As already mentioned in 4.2, the major mobile platforms are updated quite often. Test efforts and minor tweaks to make the application work with a minor platform update remain almost the same and fairly low. Major platform releases, however, may also contain support for a new generation of devices making the update quite expensive. For example, the introduction of touch screens to the BlackBerry platform also included a new way of interacting with the user that had not been available before.

In general, enterprises should expect much less support for older devices and APIs when a platform is updated. This is much less of an issue if the devices can be controlled by the enterprise, since major updates to the platform can be rolled out together with new devices and applications while keeping the old devices running with older versions of the platform and the applications.

In addition to the costs of keeping the applications running on updates, the main driver for operational costs is the over the air data traffic produced by the applications and the users exploring the mobile Web. Platforms like RIM’s BlackBerry are highly optimized for reducing the amount of data transferred over the air when accessing corporate e-mail and calendar. Many enterprises have older contracts with low limits of data transfer included. While this was appropriate for push e-mail use, the average data usage of modern smartphone users is generally an order of magnitude higher. Having the right data plans in place before rolling out the apps is therefore necessary for keeping operational costs under control.

4.5 Transform

Enterprise software vendors are a bit late to the mobile application game. But we saw many previews and announcements during 2010. For 2011 we expect to see real life products for mobile access to enterprise software by the vendors themselves. As a result, many features backed into custom mobile applications may become obsolete because of commercial off-the-shelf products available from enterprise software vendors or 3rd party entities.

We strongly recommend keeping the short life cycles in mind while planning mobile applications and being more rigid regarding retirement of mobile applications. Due to the lower complexity and much fewer dependencies, the retirement of a mobile application is much less of an issue than for large enterprise applications.

Mobile applications need to communicate with existing enterprise applications and therefore cause an impact on the existing application landscape. The legacy applications providing the backend for the mobile application have to be examined regarding their ability to expose their functionalities via Web services. In addition to that, existing Web services should take the special nature of mobile applications into account. The connection to a server is not always available and may be interrupted at any time. Traditional application programming models assume a solid connection between client and the server, and many older applications are not able to resume the state of a transaction after the connection was interrupted. The introduction of mobile applications may initiate a transformation in the life cycle of existing applications.
5 Conclusion and Recommendations

The time for smartphones to be used solely for accessing corporate e-mail and calendar is over. Sooner or later, most businesses will have to think about a mobile application strategy that will generate business value. During the hype phase of the last two years many companies had to learn their lessons. Commissioning an external company to build an attractive iPad application showing some company KPIs may seem to be a nice idea. But it may not lead to the expected results if not managed properly and aligned with an overall application portfolio.

At the end of the day, each mobile application needs to be assigned its role in an overall application portfolio. We believe a solid application management framework that respects the specific issues of mobile applications is the foundation for a successful mobile strategy. The best management framework will be of no help if the right skills are not available in-house. In the near future enterprises will need specific mobile application know-how throughout the whole lifecycle.

We strongly recommend starting to invest in this space and build the needed skill set within the IT organization. Mobile applications running on the new generation of mobile devices are an important part of the future IT. Current concerns regarding security and data protection will be less of an issue, since there are already solid solutions in the market.

As Forrester states in the outlook\(^3\) for the next 10 years, many technologies already are or will become much easier to acquire and be used by tech-savvy business employees or executives. This will significantly change the role of IT. Previously separate devices for business and private usage are merging more and more, and many users are willing to use their private devices and data plans for business purposes if they are allowed to do so. Some forward-thinking enterprises are taking advantage of this trend and allow their employees to bring their own hardware. Tech-savvy users are actively helping the IT by giving profound feedback and even helping out colleagues, thus keeping the workload off the help desk. Devices like the iPad actually have the potential to substitute the need for a desktop PC or a notebook. Some enterprises noticed that they can even save some money on hardware by embracing the “bring your own hardware” idea as a side effect of the mobile application strategy.

Far more important than hardware cost savings is the ability to attract new talent for the enterprise. Young professionals entering the job market are used to accessing data anytime and anywhere and expect to experience the same in their daily life at work. Enterprises providing such a workspace are more likely to be attractive for young professionals.

\(^3\) Forrester BT 2020: IT’s Future In The Empowered Era
6 Further Reading

- Lemken, Birgit; Hövelmanns, Norbert Dr.: Next Generation Application Strategy, 2009
- IDC: Q1 2011 Mobile Developer Report
- Forrester: IT’s Future In The Empowered Era, 2011
7 The Author

Ali Saffari has been a Managing Consultant for Detecon in the Competence Group Application Management since 2008. Following his studies of Electrical Engineering at the University of Applied Sciences in Cologne his career started as a consultant at one of Europe’s leading system integrators. Through numerous projects he has gained substantial knowledge of document and records management and also business processes in the public sector. He continued his career at a leading Web content management vendor, where he was responsible for the program and product management of several content management solutions.

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8 The Company

We make ICT strategies work

Detecon is a consulting company which unites classic management consulting with a high level of technology expertise.

Our company's history is proof of this: Detecon International is the product of the merger of the management and IT consulting company Diebold, founded in 1954, and the telecommunications consultancy Detecon, founded in 1977. Our services focus on consulting and implementation solutions which are derived from the use of information and communications technology (ICT). All around the globe, clients from virtually all industries profit from our holistic know-how in questions of strategy and organizational design and in the use of state-of-the-art technologies.

Detecon's know-how bundles the knowledge from the successful conclusion of management and ICT projects in more than 160 countries. We are represented globally by subsidiaries, affiliates, and project offices. Detecon is a subsidiary of T-Systems International, the business customer brand of Deutsche Telekom. In our capacity as consultants, we are able to benefit from the infrastructure of a global player spanning our planet.

Know-how and Do-how

The rapid development of information and telecommunications technologies has an increasingly decisive influence on the strategies of companies as well as on the processes within an organization. The subsequent complex adaptations affect business models and corporate structures, not only technological applications.

Our services for ICT management encompass classic strategy and organization consulting as well as the planning and implementation of highly complex, technological ICT architectures and applications. We are independent of manufacturers and obligated solely to our clients' success.