Transforming Enterprises through Mobile Applications: A Multi-Phase Framework

Rahul C. Basole
Tennenbaum Institute
School of Industrial and Systems Engineering
Georgia Institute of Technology
rbasole@isye.gatech.edu

ABSTRACT

Mobile applications have become an important strategic imperative to many leading enterprises. While the potential value and impact of enterprise mobility is understood, only little is known about the transformational capabilities of mobile applications. This research develops a conceptual multi-phase framework of mobile transformations by integrating the emerging literature on mobile business and enterprise transformation with best practice approaches employed in industry. The framework provides a basis for future mobile enterprise oriented studies, enhances our understanding of mobile application opportunities, and facilitates the development of appropriate mobility strategies.

Keywords

Mobile Applications, Enterprise Transformation, IT Strategy

INTRODUCTION

New mobile information and communication technology (ICT)-based capabilities have the potential of providing enterprises with the means to achieve dramatic gains in productivity, efficiency, and other important business performance metrics (Gebauer & Shaw, 2004; Nah, Siau, & Sheng, 2005). Mobile applications have been successfully implemented and deployed by leading enterprises in a wide range of industries (see Table 1). In many cases, the use of mobile applications has led to improved operational performance, asset utilization, sales effectiveness and customer service as well as faster access to critical data at the point of work, accelerated communications, and improved decision-making (Gabriel, 2004).

Category	Application	Selected Examples[1]
Communications	E-Mail, Messaging, Video Conferencing Personal Information Management	Lufthansa Systems, Britannia Airways, IBM Global Services
Supply Chain Management (SCM)	Asset Tracking Inventory Management	Ford, Pepsi, Hertz, UPS
Customer Relationship Management (CRM)	Sales Management & Field Service Contact Management	Merck, Nextel BellSouth, Bayer
Enterprise Resource Planning (ERP)	Asset and Order Management Invoice Generation	Shell, ChevronTexaco, US Navy, Xerox
Human Resources (HR)	Time and Expense Tracking	Allstate Insurance
Mobile Commerce	Mobile Banking Alerts	Bank of America, E-Trade, Intercontinental Hotels, Delta Airlines

Table 1. Mobile Enterprise Applications

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[1] Selected examples have been taken from documented case studies (Broadbeam, 2003; Everypath, 2004; Infowave, 2004)

While there are many influential drivers for adopting mobile applications, the enterprise mobility market is still in its infancy. One major reason for the slow adoption of mobile applications is the lack of compelling value that existing solutions have provided. Similar to the beginnings of the e-business era, the mobile industry is searching for a "killer" application and mobility platform that will drive the growth of mobile enterprises. While a few mobile data services have been successful in various regions of the world, such as short text message services (SMS) in Europe, i-Mode in Japan, and wireless e-mail using RIM's Blackberry devices in North America, no mobile application has found significant traction in the enterprise domain to date. It is without a question that mobile enterprise applications will rapidly emerge as certain technological, environmental, and organizational barriers are overcome. While mobilizing enterprise applications and providing business professionals access to information anywhere and anytime is an important step to attain the aforementioned performance improvements (Kornak, Teutloff, & Welin-Berger, 2004), these gains are only the beginning; this research argues that enterprises can realize a much broader range of benefits over time by following a mobile transformation process. Current research has shown that information technology has the ability to change and radically transform enterprises in a number of ways (Basole & DeMillo, 2005). The transformational impact can be realized at the strategic, business process, organizational structure and cultural level, among many others.[2] However, the unique functionalities and capabilities of mobile information and communication technologies require a new perspective on technology-enabled transformation (Basole, 2004). While initial case studies have alluded to the potential value and impact of mobile enterprise applications, only little is known about the dynamics of mobile transformations.

This research develops a conceptual multi-phase framework of mobile transformations to provide insights into the dynamics of the transformation process. The objective of this research is to understand the benefits and challenges of mobile transformations, facilitate the development of appropriate mobility strategies, and provide a basis for future mobile enterprise oriented studies.

MOBILE TRANSFORMATION FRAMEWORK

The adoption and implementation of mobile solutions is a more recent enterprise trend (Kalakota & Robinson, 2001). Hence, only little research on the impact, value, and best practices of enterprise mobility exists. Most research has focused their attention on the enablers and drivers of mobile ICT in enterprises (Ferguson & Pike, 2001; Tarasewich, Nickerson, & Warkentin, 2002). Others have examined potential mobile application areas (Varshney & Vetter, 2002).

While an understanding of the factors that lead to mobile ICT assimilation and the identification of potential application areas is important, an equally critical research issue is the examination of the transformational capabilities of mobile solutions and their long-term impact. A few select studies have alluded to the fact that mobile solutions have a potential value far beyond mere business process improvements and enhancements (Basole, 2004). Extending this work, four distinct phases of mobile transformations, as shown in Figure 1, are proposed.

Phase 1 - Mobilization

Phase 1 of the transformation process begins with the mobilization of existing data, applications, and processes. Mobilization refers to the process of making enterprise data, processes, and applications available for use on mobile and wireless devices. The first phase aims to provide end-users with a new level of convenience by enabling access to context-relevant information anywhere and anytime. Early solutions within this phase were primarily mobile extensions of their fixed-wired counter-parts and were often 'mobilized' without the mobile end-user and context in mind. Enterprise applications were "transcoded" or "morphed" to fit and be used on mobile devices, and often customized to the end-user target group (Britton, et al., 2001). More recent mobile applications take the user and context into consideration, delivering a higher level of technology-fit and ease-of-use, and are often off-the-shelf mobile applications (Gebauer & Shaw, 2004; Tarasewich, et al., 2002).

Previous research on re-engineering, automation, and transformation efforts has shown that the introduction of information technology in organizations has a profound impact on several operating performance measures (Davidson, 1999; Venkatramam, 1994). This research adapts these findings and proposes that in addition to a higher level of convenience, the use of mobile applications will also lead to significant performance gains in productivity, speed, efficiency, quality, and customer service (Basole, 2004).

Phase 2 - Enhancement

The second phase shifts its focus from mobilizing existing processes and applications to enhancing and creating new data, applications, and processes that leverage the unique functionalities and capabilities of mobile technologies. Enhancements

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[2] For further information, (Rouse, 2005) provides a comprehensive framework and examples of enterprise transformations.

typically appear in the form of value-added services; as end-users continue to use mobile applications, new services and flow of information will emerge (Barua, Konana, Whinston, & Yin, 2004). These enhanced mobile processes enable end-users to perform their tasks with a higher level of convenience and efficiency (Air2Web, 2004). One example of mobile enhancement can be seen in the emergence of location-based applications. Location-based applications take advantage of the geographical data provided by GPS information systems. Logistics and transportation providers, such as UPS and FedEx for example, are leveraging GPS applications to provide their workers with information to avoid traffic congestions, propose alternate routes, and direct them to the next pick-up/delivery location. Mobile enhancements can also be found in the domain of customer relationship management applications. Today's field workers and sales professionals not only have direct access to relevant information on-the-go, but are also capable of updating relevant corporate data (such as inventory), managing personal schedules, and providing their clients more accurate and relevant information, hence, leading to a higher level of customer service.
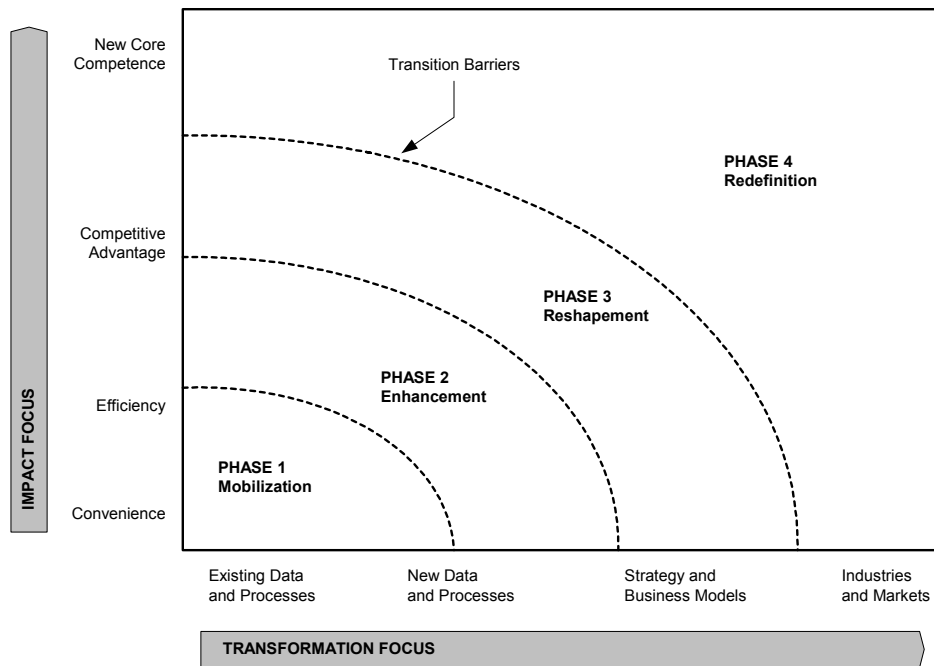

Figure 1. Phases of Mobile Transformation

Phase 3 - Reshapement

As enterprises transition to phase 3, mobile solutions begin to reshape business models and strategies. The creation of innovative new mobile processes and services provide enterprises with a source of competitive advantage. In this phase, mobile solutions often become a critical element in the overall business model. A good example of mobile reshapement is the check-in and check-out procedure employed by car rental agencies. Customers can completely bypass the service counter process, head straight to their vehicle, and leave with the touch of a few buttons on their cell phone. Leading car rental agencies have reshaped their business strategies around these emerging mobile technologies, facilitating the rapid check-out of vehicles, and improving customer service. Another excellent example of mobile reshapement is the use of radio frequency identification (RFID) tags; as more enterprises use and require RFID in their supply chain, business models and strategies will change significantly.

Phase 4 - Redefinition

In the fourth and final phase of the transformation process, mobile solutions create new core enterprise competencies. Business models and strategies are based and revolve around enterprise mobility and in turn lead to a redefinition of entire

markets and industries. Concrete examples for this phase of the mobile transformation have not emerged yet, however, as enterprises continue to embrace mobility and mobile ICT mature, mobile redefinition is expected to become a common enterprise phenomenon.

The four phases of mobile transformation are not purely sequential. Activities performed during Phase 1 continue during Phases 2-4. Some companies have directly moved from Phase 1 to Phase 3 or started in Phase 2. Phase 4 examples are still scarce, but are poised to emerge as mobile technologies continue to evolve and new business models take shape. Yet, all four phases are inextricably linked in significant ways. Diligent pursuit of Phase 1 initiatives will lead to many Phase 2 and 3 opportunities. Similarly, Phase 4 opportunities will emerge as enterprises realize the full transformational potential of mobile solutions.

Transition Barriers

Mobilizing the enterprise is an immensely complex undertaking (Kornak, et al., 2004). As with most change processes, enterprises will face a number of transition barriers between the four mobile transformation phases. These transition barriers can be broadly categorized as organizational/strategic, technological, and environmental-related.

The first transition barrier is related to an enterprise's strategy. Investment in mobile enterprise solutions requires a careful consideration of the "business value versus cost" issue. With shrinking IT budgets, it becomes critical to understand what enterprise mobility can deliver and where it can improve, optimize, and transform the bottom-line. Mobile enterprise solutions must therefore be aligned with the overall business strategy and support enterprises current and future business objectives. In order to avoid a "fragmented" transformation, enterprises should have a common vision, leadership support, and a strategic path to implementing enterprise mobility. A related transition barrier commonly experienced in the infusion of emerging technologies is the resistance to change. Newly mobilized business processes may require end-users to adopt, use, and learn new ways of performing tasks, and unlearn old methods. Appropriate reward systems, organizational encouragement, training, and support may aid in overcoming this barrier. Another barrier to mobile transformation is organizational culture and level of innovativeness. As end-users have the capability to conduct their work anywhere and anytime, and are not bound to traditional work environments, new enterprise structures and work environments may emerge. New business models and strategies will also lead to a change in organizational processes and structure. Hence, enterprises with flexible structures, cultures, and high levels of innovativeness may experience a more successful mobile transformation.

While mobile ICT have significantly advanced in recent years, the technology is still in its infancy. Enterprises must therefore take the level of technology maturity into consideration when pursuing mobile transformations. An important precursor to this is the identification of an enterprises' mobile readiness. Mobile readiness refers to the potential and preparedness to adopt mobile ICT; low mobile readiness is thus a significant transition barrier. In order to overcome this barrier, enterprises must build an appropriate enterprise architecture and technology infrastructure that can support current mobile solutions and accommodate future capabilities.

CONCLUSIONS

Successful mobile transformations require a long-term vision and support from all the stakeholders. This research argues that mobile enterprise solutions have a value and impact far beyond today's applications. In fact, it is argued that mobile solutions will transform enterprises in several significant ways. Mobile transformations occur in four distinct, but not necessarily sequential, phases. Between each phase, enterprises will experience transition barriers. Mobile transformations are impacted by both internal and external factors. The framework provides a basis for future mobile enterprise oriented studies, enhances our understanding of mobile application opportunities, and facilitates the development of appropriate mobility strategies. Future research directions of particular interest will include an empirical examination of the factors during inter- and intra-phase transitions, an in-depth investigation of mobilization criteria, and a qualitative approach to studying successful and failed mobile transformations.

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