



Mobilizing customer relationship management

A journey from strategy to system design

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Abstract

Purpose – The bursting of the e-bubble affected expectations with regard to mobile initiatives and willingness to invest in them very negatively. Business managers request detailed and thorough analyses prior to engaging in mobile initiatives. The paper aims to present a method, with which mobile business can be introduced to the customer relationship management (CRM) field.

Design/methodology/approach – The paper follows the design science paradigm as outlined by March and Smith, and Hevner *et al.*

Findings – The findings provide a framework for the definition of a mobile CRM strategy derived from the corporate strategy, suggest a method for the identification and exploitation of the mobilization potential in CRM processes in line with the strategy, and provide guidance for the design of mobile information systems to support these processes.

Research limitations/implications – The proposed method extends the body of available methods with a method for the introduction of mobile ISs into marketing, sales and service organizations. As design research, it does not strive for statistical generalization. The level of detail given in the elements of the method is to be increased in further research.

Practical implications – The method helps to reduce risk and uncertainty of mobile CRM initiatives, since it provides a structured and consistent procedure for the definition of goals, the identification of potentials for the fulfillment of these goals as well as recommendations for the systematic exploitation of these potentials.

Originality/value – With the application of this structured method, an organization should be able to avoid the pitfalls of technology-driven information technology initiatives which various companies have experienced, particularly with mobile technologies.

Keywords Mobile communication systems, Relationship marketing, Customer relations, Business planning

Paper type Research paper

Introduction

In the late 1990s, at the peak of the e-commerce boom, overly optimistic expectations were geared towards internet-based commerce's next level: mobile commerce (MC) or m-commerce (Feldman, 2000). After the e-commerce bubble had burst, m-commerce, too, failed to meet those expectations, a prominent example being the Wireless Application Protocol (WAP) (Ramsay, 2001).

Recently, mobile business (MB) and MC have begun to re-emerge as a promising field (Urbaczewski *et al.*, 2003). Businesses now question the effectiveness of their (mobile) activities and investments more stringently than before. To ensure mobile activities' success, a structured method is required in respect of mobilization.

A common approach to managing problems' complexity, is the division of the problem space into multiple subspaces with limited, manageable interdependencies



(Scheer, 1995; Ferstl and Sinz, 1998). The business engineering (BE) approach as defined by Österle (1995, p. 353) is a framework that is specifically geared towards the subdivision of problems regarding business models' transformation in order to adapt to the information age.

An important aspect of designing business models is the interaction between businesses and their customers, which includes the management of customer-related information and business activities. This field of business is often referred to as customer relationship management (CRM). The nature of business-to-customer interaction includes business processes spanning multiple locations (e.g. back office functions within the business' offices and direct customer contact at the customer's site). Applying MB principles and technologies to the CRM field does therefore seem to have reasonable potential.

No structured method has yet been defined for the design of mobile solutions in the CRM field that will cover all of a comprehensive framework's perspectives, such as the BE framework. In this paper, we analyze different approaches to the design of MB, each of which address a different part of the BE framework, and from these synthesize a comprehensive method.

Research methodology and structure

Since, the research goal is the construction of a new method, we follow the design science approach as described by March and Smith (1995) and Hevner *et al.* (2004). "Design science [...] creates and evaluates IT artifacts intended to solve identified organizational problems":

In the design-science paradigm, knowledge and understanding of a problem domain and its solution are achieved in the building and application of the designed artifact. [...] Such artifacts are not exempt from natural laws or behavioral theories. To the contrary, their creation relies on existing kernel theories that are applied, tested, modified, and extended through the experience, creativity, intuition, and problem solving capabilities of the researcher (Hevner *et al.*, 2004).

We applied an inductive approach to the design of the method that we present in this paper. The current need for a structured method in respect of mobilization was revealed in an empirical study conducted by the authors' team: 60 percent of the respondents indicated that they were planning, or already implementing, a mobile CRM extension (Salomann *et al.*, 2005). None of these respondents indicated that they would use or had used a structured method in the process.

We used the BE framework to structure such a method's requirements, subsequently analyzing the existing literature for contributions. The analysis yielded several approaches, each addressing a subset of the identified requirements. These approaches do not fit together smoothly because there are missing links between the different elements, e.g. business process analysis approaches do not indicate how benefits should be prioritized to provide a strategy-aligned solution.

Following Hevner *et al.* (2004), we begin with a description of the problem space in the second section. This includes a description of our BE research framework, a description of the CRM concept and MB concepts in general as well as, specifically, MB and CRM's potential intersections. As suggested by March and Smith (1995), we analyze existing research that is relevant to our problem space in the third section. In the fourth section, we present a comprehensive method for the mobilization of CRM

that covers all of the BE approach's perspectives by combining and linking the elements described in the third section. In the fifth section, we summarize the results and the possible implications. The last section concludes the paper and outlines options for further research.

Background

Business engineering

BE is a structured approach to managing the transformation of businesses into a business model suitable for the information age (Österle, 1995, p. 13). It divides a business transformation exercise into discrete projects, or a project portfolio, and separates the project into the conceptual design and the management of the change involved. The conceptual design is then again subdivided into three levels (Österle and Blessing, 2003):

- (1) On the strategy level, decisions regarding an enterprise's long-term development have to be made. This comprises decisions regarding strategic alliances, the company structure, market services offered, customer segments addressed, and the distribution channels.
- (2) Within the processes level, strategic decisions are implemented. Processes produce a company's products and services through the execution of a number of tasks with defined inputs and outputs. Questions to be answered in process development concern the planned process outputs, the optimal sequence and distribution of tasks, and the process management.
- (3) The execution of processes is supported by information systems (ISs) in the form of application software. The basis of ISs is information technology (IT), consisting of hardware, networks, and operating systems software.

Spanning all three levels, change management considers, among other things, the stakeholder groups, the profitability of the solution (the ROI analysis) and the project management (Österle and Blessing, 2003). Although he does not refer to BE, Chen (2005) suggests similar building blocks for a methodology with which to build mobile computing applications, without specifically focusing on a particular type of mobile application (such as mobile CRM).

Customer relationship management

We define CRM as a complex set of interactive processes that aims to achieve an optimum balance between corporate investments and the fulfilling of customer needs in order to generate maximum profit. CRM's origins can be traced to the relationship marketing (RM) management concept (Levitt, 1983), which is an integrated effort to identify, build up and maintain a network with individual customers for the mutual benefit of both sides (Shani and Chalasani, 1992, p. 34). RM is of largely strategic character, and lacks a holistic view of business processes, although they are regarded as important (Parvatiyar and Sheth, 2000).

Strategically, we consider CRM as viewing customer relationships as an investment that will contribute to the enterprise's bottom line. Customer relationships' design and management are aimed at strengthening an enterprise's competitive position by increasing customers' loyalty. While this extends beyond the use of IT, IT is still an important enabler of modern CRM.

Apart from strategy-oriented approaches such as RM and other systems-oriented concepts, there are several CRM approaches with a special focus on business processes (Schulze *et al.*, 2000). Generally, CRM processes not only require transactional data, which can be automatically collected and stored in relational databases, but also a significant amount of knowledge. Furthermore, CRM processes are usually complex and only structured to a certain extent. Consequently, they can be considered knowledge-intensive processes (Eppler *et al.*, 1999; Schwarz *et al.*, 2004). Besides, developing an integrated view of CRM processes, it is therefore critical to address the management of knowledge flows from and to the customer across all communication channels as well as to enable the use of the knowledge about the customers. A detailed classification and description of business processes in the CRM field, with a particular emphasis on knowledge intensity, is provided by Geib *et al.* (2005).

In the past, advances in IT had a significant influence on CRM. Obviously, these were mainly focused on the IS layer and neglected their connections to CRM processes and strategy. The goal was to support the existing, isolated approach to dealing with customer relationships. With CRM philosophy aiming at creating an integrated view of the customer across the enterprise, these systems were connected and today form the building blocks of comprehensive, integrated CRM systems. According to the Metagroup, CRM systems can be classified into the following three sub-categories:

- (1) Operational CRM systems improve CRM delivery's efficiency and support processes. They comprise solutions for marketing, sales and service automation.
- (2) Collaborative CRM systems manage and synchronize customer interaction points and communication channels.
- (3) Analytical CRM systems store and evaluate knowledge about customers for a better understanding of each customer and his behavior.

Mobile business and mobile CRM

Technological advancements in mobile communications enable new ways of doing business (Raisinghani, 2002), often referred to as "mobile business" or "mobile commerce". While Turowski and Pousttchi (2003) do not distinguish between the two but rather use the term "mobile commerce," Lehner (2003) and Zobel (2001) define "mobile business" as the application of mobile technologies to improve or extend business processes and open new market segments. They differentiate between "mobile business" and "mobile commerce," the latter being a rather subordinate MB field focusing on the handling of transactions. With a similar understanding of the term, Möhlenbruch and Schmieder (2001) conceptualize MB in analogy to electronic business and distinguish fields such as mobile supply chain management, mobile procurement, mobile CRM, etc. We follow this more general understanding and concentrate on mobile CRM, which we define as mobile technologies' application in order to support CRM processes (mCRM).

There is a plethora of publications regarding typical benefits of mobile technologies and MB or MC. The subject has been approached both from a more technical point of view as well as from a business perspective. Therefore, we derive two classifications of typical benefits from available literature. The first classifies the technical advantages of MB over web-based e-commerce as known so far (Table I).

Benefit	Definition	References
Ubiquity	Mobile technologies allow for ISs to become accessible from virtually any place and at virtually any time	Clarke (2001), Wohlfahrt (2001), Anckar and D'Incau (2002a, b), Balasubramanian <i>et al.</i> (2002), Lehner (2003, 11ff.), Pousttchi <i>et al.</i> (2003), Laukkanen (2005) and Laukkanen and Lauronen (2005)
Context sensitivity	Mobile technologies allow for the contextualization of ISs. The context may include the identification of the individual user as well as geographic position and physical environment	Clarke (2001), Wohlfahrt (2001), Lehner (2003, 11ff.), Pousttchi <i>et al.</i> (2003, 11ff.), Wamser (2003), Siau <i>et al.</i> (2004b), Laukkanen (2005), Laukkanen and Lauronen (2005) and Skelton and Chen (2005)
Interactivity	Mobile technologies allow for greater interactivity in ISs, since they typically provide an "always online" connectivity and have shorter set up times (e.g. for booting, "instant on")	Clarke (2001), Hartmann and Dirksen (2001), Anckar and D'Incau (2002a, b), Lehner (2003), Laukkanen (2005, 11ff.) and Laukkanen and Lauronen (2005)
Convenience and familiarity	For certain tasks, mobile technologies can offer a higher degree of convenience as compared to standard desktop or laptop PCs. This is partially due to limited functionality, thus reduced complexity and higher ease of use. For example, most users are capable of using most features of their cell phones (voice and text communication, address book, etc.) while most users only use a fraction of their PCs functionality	Kenny and Marshall (2000), Perry <i>et al.</i> (2001), Wohlfahrt (2001), Anckar and D'Incau (2002a, b), Gebauer (2002), van der Heijden and Valiente (2002), Lehner (2003, 11ff.), Gebauer and Shaw (2004) and Siau <i>et al.</i> (2004b)
Multimediality	Mobile technologies have gained multimedia functionality over the years, e.g. most cell phones shipped today include a digital camera, current models even with sufficient resolution for quality snapshots	Pousttchi <i>et al.</i> (2003), Wamser (2003), Han <i>et al.</i> (2005), Wolf and Wang (2005) and Kung <i>et al.</i> (2006)

Table I.
Overview of technical
benefits of mobile
technologies

These technical advantages do not yet contribute any business value as such, but they need to be transformed to some business process improvements. Typical types of such business process improvements realized by applying MB technologies are listed in Table II.

Typical examples of mCRM are mobile marketing (MM), mobile sales force automation (MSA) and mobile field service (MFS), or mobile customer service (MCS). MM takes advantage of the ubiquity, context sensitivity and interactivity to make campaigns more entertaining and effective (Balasubramanian *et al.*, 2002; Reichold *et al.*, 2003). MSA and MFS support sales agents and field service agents (Turowski and Pousttchi, 2003, p. 196; BenMoussa, 2004), leveraging ubiquity and interactivity resulting in higher organization efficiency and individual productivity. MCS usually leverages ubiquity and interactivity, resulting in higher effectiveness and higher process transparency (Looney *et al.*, 2004; Mallat *et al.*, 2004; Kadyte, 2005).

Benefit	Definition	References
Flexibility	The ubiquity and interactivity of MB applications allow for the break-up of process structures. Activities in processes, which were previously bound to location or time constraints, can now be dispatched more flexibly. Unforeseeable events can be responded to more flexibly and timely, since decision makers and action takers can be informed and immediately wherever they are and can be involved in the emergency response interactively	Fleisch (2001), Hartmann and Dirksen (2001), Perry <i>et al.</i> (2001), Wohlfahrt (2001), Anckar and D'Incau (2002a, b), Fleisch and Bechmann (2002), Fleisch <i>et al.</i> (2002), Gebauer (2002), Humpert and Habbel (2002), Reichwald and Meier (2002), van der Heijden and Valiente (2002), Wamser (2003), Gebauer and Shaw (2004), Nah <i>et al.</i> (2004), Siau <i>et al.</i> (2004b), Laukkanen (2005), Laukkanen and Lauronen (2005) and Nah <i>et al.</i> (2005)
Organizational efficiency	The ubiquity and interactivity of MB applications allows for higher operational efficiency since the gaps between information's point of creation and its point of action can be bridged, e.g. field agents can enter information electronically and directly to corporate ISs, thus duplicate entry can be eliminated and backend processing of the information can begin immediately. Information is available ubiquitously and immediately and can be used in geographically dispersed processes and activities	Hartmann and Dirksen (2001), Perry <i>et al.</i> (2001), Wohlfahrt (2001), Anckar and D'Incau (2002a, b), Fleisch and Bechmann (2002), Fleisch <i>et al.</i> (2002), Gebauer (2002), Humpert and Habbel (2002), van der Heijden and Valiente (2002), Wamser (2003), Gebauer and Shaw (2004), Nah <i>et al.</i> (2004), Siau <i>et al.</i> (2004b), Kadyte (2005), Laukkanen (2005), Laukkanen and Lauronen (2005), Nah <i>et al.</i> (2005) and Skelton and Chen (2005)
Individual productivity and effectiveness	Context sensitivity, interactivity as well as convenience and familiarity of MB applications allow for a greater level of effectiveness of business processes and a higher individual productivity. Interactive and context sensitive offerings can increase the effectiveness of marketing campaigns. Interactive and ubiquitous control mechanisms can increase effectiveness of machines since they can send alerts in case of errors. Similarly individual productivity of employees can be increased since they can use waiting time more effectively (e.g. in airport terminals)	Perry <i>et al.</i> (2001), Wohlfahrt (2001), Anckar and D'Incau (2002a, b), Gebauer (2002), van der Heijden and Valiente (2002), Wamser (2003), Gebauer and Shaw (2004), Nah <i>et al.</i> (2004), Siau <i>et al.</i> (2004b), Kadyte (2005), Nah <i>et al.</i> (2005) and Skelton and Chen (2005)
Transparency	Ubiquity and interactivity of MB processes allow for the increase of process transparency. This decreases costs for process control and customer satisfaction. Transparency of information can lead to higher market transparency and thus more efficient market mechanisms, e.g. customers can compare prices online while in a retail store	Wohlfahrt (2001), Reichwald and Meier (2002), Wamser (2003), Chen (2005), Kadyte (2005), Laukkanen (2005) and Laukkanen and Lauronen (2005)

(continued)

Table II.
Overview of business
benefits of MB and MC

Table II.

Benefit	Definition	References
Entertainment	Especially, multimediality but also ubiquity and interactivity increase the entertainment gained from MB applications. Entertainment content typically is multimedia-based in nature, thus entertainment devices need to be multimedia-enabled. Additionally, mobilization of everyday life leads to more mobile and spontaneous entertainment needs	Anckar and D'Incau (2002a, b), Humpert and Habbel (2002), Reichwald and Meier (2002), Han <i>et al.</i> (2005), Wolf and Wang (2005), Wong and Hiew (2005), Dickinger <i>et al.</i> (2006) and Park (2006)

Related work

In this section, we analyze existing approaches which contribute to the mobilization of CRM. Following the BE framework, the analysis will be structured into strategy, process and ISs. Change management is supposed to be an ongoing effort associated with activities on all these layers (see above). In order to explicitly analyze change management approaches, we will deal with these in a separate section.

Strategy perspective

Zetie (2002) outlines a mobile enterprise strategy's essential elements: identification of business values, identification of essential mobile services, definition of the required level of mobility and "wireless-ness" a strategic choice of devices and platforms, including an integration architecture, and, finally, a set of system management and usage policies. The choice of devices and platforms as well as that of policies will most likely be closely linked to a general IT strategy rather than being specific for a mobile CRM strategy. The business values and core services can obviously be specific to CRM, while a clear understanding of the required level of mobility and "wireless-ness" also depends on the application domain. Clarke (2001), for example, envisages four types of general value propositions of MC and MB (ubiquity, localization, personalization, convenience) that have specific instantiations in CRM, e.g. ubiquity could be a sales agent having access to a customer's history from anywhere. A classification of MB value propositions is listed in Table II.

Colgate and Danaher (2000) point out the importance of not only having a customer relationship strategy, but also executing it properly. Following the BE framework, the strategy is implemented by choosing proper processes and by redesigning them in compliance with the strategy and also by suitably communicating the strategy to the relevant stakeholders. Lockamy and Smith (1997) suggest linking strategy, processes and IT and provide principles with which to do so. Following these principles and building up on the works of Treacy and Wiersema (1994), Crawford and Mathews (2001) and Schierholz *et al.* (2005) outline a framework of customer-oriented strategy goals and provide recommendations regarding what to look for in processes to be mobilized. This framework identifies five high-level value propositions. Companies are advised to select one primary and one secondary goal and focus on the mobilization of processes with specific properties:

- (1) *Price*. Companies offering a low, transparent and fair price in comparison to others in the market should mobilize processes in which the business

information's point of creation and point of action differ. This approach to mobilization avoids breaches in time and space, or media.

- (2) *Customer intimacy*. Companies offering an uncomplicated service on a personal level, thus establishing a one-to-one relationship with customers, should mobilize processes which support the customers' needs in spontaneous and unforeseeable situations.
- (3) *Accessibility*. Companies offering simple, anytime-anywhere-anyhow access to products should mobilize processes which extend the communication channels between them and their customers.
- (4) *Innovativeness*. Companies that are perceived as innovators or early-adopters of new, innovative technologies should mobilize processes with a strong external visibility.
- (5) *Product quality*. Companies offering the best product features in the market cannot support their strategy easily through mobilization unless they offer products closely related to mobile technology or knowledge-intensive services.

This approach provides a starting point for a mobile CRM method which covers Zetie's (2002) first two prerequisites and should be completed with elements for process analysis and design, system design and selection as well as change management.

Business processes perspective

Valiente and van der Heijden suggest a five-step method with which to analyze business processes in order to identify mobilization potential (van der Heijden and Valiente, 2002). Basically, they suggest mapping existing processes with a standard process modeling method, adding location and mobility information to all activities and identifying the information dependencies between location and mobility. Afterwards, the mobility of the actors in the model is increased (or "complicated" as Valiente and van der Heijden call it), which is then supposed to indicate potential for mobilization, if there are dependencies between the mobile actors or actors at differing locations. In a final step, these potentials should be evaluated for exploitability by means of mobile ISs. However, Valiente and van der Heijden do not suggest a way of transforming the artificially complicated process model into realizable processes. Moreover, their method does not cover the focus on specific goals which should be derived from a pre-set strategy. The compliance with desired goals only occurs in a final step. Therefore, virtually all processes within an organization would need to be analyzed, which seems impracticable.

With their mobile business process landscaping (MBPL) method, Gruhn *et al.* aim to overcome this weakness (Gruhn and Book, 2003; Köhler and Gruhn, 2004). They suggest the multi-layered modeling of business processes, beginning on a macro layer that describes the core business processes on a level such as "there is a sales process" (Köhler and Gruhn, 2004, p. 242). They suggest identifying dependencies between processes and organization units by adding location and mobility attributes, similar to that suggested by Valiente and van der Heijden. The next levels of analysis are the function level, the activity level and, finally, the information object level. After modeling each level, only those elements of the model in which a mobility potential has been identified, need to be investigated further. In our opinion, there is the risk that, in the beginning, potentials will be overlooked in MBPL due to the abstraction level being

too high, which means that the dependencies between units will be internalized into a larger unit and will, consequently, not appear in the model. For example, on the level of “there is a sales process,” the dependencies between the field sales agents and their back-office functions are internalized.

There is obviously a conflict between the goals of practicability and the accuracy of the modeling method. Davenport *et al.* (1996) focus specifically on the reengineering of knowledge-intensive processes and find that the involved individuals will most likely not accept an overly structured approach. Since, we have already identified CRM processes as knowledge intensive, this should also be applied in our context. A designed solution’s acceptance is more likely to be achieved if the final users are involved in the design process. Peffers and Tuunanen (2005) thus suggest applying participative methods, such as the critical success chains method, to leverage the available knowledge within the organization.

Processes consist of activities and often it is not the entire process which is mobilized, but only certain activities within the process. This is reflected in the goal of breaking down the process as declared by Valiente and van der Heijden as well as by Gruhn *et al.* Several authors suggest task characteristics to be included when modelling mobile applications or services. These can be combined to the following framework depicted in Table III.

Information systems perspective

Traditional IS are typically designed for stationary use and are thus based on highly standardized hardware components such as desktop and laptop PCs. Hence, the IS design can focus on the software components and consider the hardware given and consequently external to the system (this even applies to parts of the software such as the operating system). However, this does not hold true for a mobile IS. The choices for access devices are numerous and heterogeneous in features and functionality. The choice made impacts the further design decisions, since the devices are not standardized to a level equal to that of desktops. The options include the laptop, already known from stationary IS, or its “twin,” the TabletPC. More common choices are handheld devices such as personal digital assistants and cellular phones as well as a combination of the latter, the so-called smartphones. Analysts such as Forrester Research regularly provide overviews and classifications of such devices (Golvin *et al.*, 2004).

The choice of device should obviously be made with respect to the intended application context (Allen and Wilson, 2004; Haugset, 2004). As far as the software platform is concerned, the device decision usually determines the device platform as well, but for a mobile IS there are still further multiple choices. Vendors such as SAP, Siebel and Microsoft offer mobile clients for their CRM products, which can either be run locally on different platforms, such as PalmOS or Windows Mobile (in connected or disconnected mode), or on a mobile web browser as a thin client (only in connected mode). This already implies suitability in respect of different tasks as defined in the process analysis. Obviously, applications which can also be run in disconnected mode support a wider range of locations and mobility requirements, since despite all ubiquity promises wireless networks (cellular or other) are not reliably available in every situation.

Characteristic	Definition and values	References
Intention to use	The intention for the usage of an application or service can be information access, data processing, notification, or two-way communication	Gebauer (2002) and Gebauer <i>et al.</i> (2004, 2005a, b)
Task type	The task for which the mobile application or service is applied can be of the type leadership, routine task, need for exception handling, interactivity, interdependence, or mobility	BenMoussa (2004) and Gebauer <i>et al.</i> (2004, 2005a, b)
Predictability	The mobile application's or service's delivery or usage is either predictable or unpredictable (i.e. in reaction to exceptional events)	Anckar and D'Incau (2002b) and Schierholz <i>et al.</i> (2006)
Customer segment or user group	A mobile application or service can be offered for one specific user group or customer segment, for several or all users or customer segments. Sometimes it is provided for several user groups or customer segments with different parameter values	Schierholz <i>et al.</i> (2005, 2006)
Communication type	The mobile application or service is either initiated by the enterprise's system (push), or by the customer (pull).	Gebauer (2002), Gebauer <i>et al.</i> (2004, 2005a, b), and Schierholz <i>et al.</i> (2005)
Application type	A mobile application or service architecture can be, e.g. of the type smart client, which is installed on the customer's device, messaging via SMS, or wireless internet via WAP	Gebauer (2002), Mallick (2003, pp. 89-111) and Gebauer <i>et al.</i> (2004, 2005a, b)
Ease of use	This attribute depends on various mobile application characteristics. We suggest the focus to be laid on the amount of text the customer needs to type in, the number of interactions, the difficulty and number of parameters to remember (e.g. username, password). Values are high (one interaction, nothing or small volume text to type in, nothing to remember), medium (multiple interactions, medium to high-volume text to type in, few parameters to remember) and low (multiple interactions, high-volume text to type in and more parameters to remember)	Gebauer (2002), Gebauer <i>et al.</i> (2004, 2005a, b), Lee <i>et al.</i> (2004) and Siau <i>et al.</i> (2004a)
Benefits to the user	Categories of technical benefits are ubiquity, context sensitivity, interactivity, convenience and familiarity as well as multimediality as explained in Table I, business process benefits are flexibility, efficiency, effectiveness, transparency and entertainment as explained in Table II	Tables I and II

Table III.
Characteristics of mobile applications and services

Besides, clients for mobile users, their integration with the backend enterprise applications is crucial to fully exploit the mobile potential. Standard offerings, such as SAP, Siebel or Microsoft's mobile CRM, integrate via their enterprise's CRM systems. However, examples from the industry are often based on custom-developed solutions, for which there are multiple technical approaches to integration. Sairamesh *et al.* (2004) propose an architecture which specifically takes disconnection, synchronization and application context into consideration. A prototypical implementation of their architecture, based on Java technologies, promises a generic and flexible applicability. Mobile middleware is already available as well, examples being the Java-based IBM everyplace product family, or the.NET-based Microsoft framework which is also available in a compact edition suitable to mobile devices.

An implementation that integrates a complex domain-specific enterprise application such as CRM, is, however, still lacking. Shepherdson *et al.* (2003) suggest a framework called "mPower" which is based on multi-agent technology and provides a reference implementation that supports a mobile workforce. Another approach is to extend stationary workflow management approaches to distributed and mobile workflows, thus providing a formal method with which to model these workflows based on the business process execution language.

None of these approaches provide a link to the process analysis as described above, though. Consequently, the activities used in the system model have not been methodologically derived, and the attributes included in the description are mostly technology driven instead of reflecting business requirements.

Change management perspective

Multiple studies on consumer acceptance of mobile services and applications have been performed. It has been suggested that consumers' attitude towards MM is dependent on marketing messages' informativeness (enhanced by personalization and localization) and entertainment (defined by perceived joy, perceived playfulness and flow). Ankar *et al.* (2003) analyzed consumers' adoption of MC applications and found that adoption/rejection decisions were determined more by the perceived benefits than by the perceived barriers on which models, such as the technology acceptance model (Davis, 1989), focus. Constantiou *et al.* (2004) support this by finding that the price of mobile services (obviously the counterpart of its value) "remains the most important attribute."

Very little research investigates the adoption of mobile applications in a business context. In this context, factors such as employer policies can obviously override individual preferences. Nevertheless, user acceptance is a critical issue. Haugset (2004), for example, finds that smaller devices are not necessarily better and that "supporting nomadic work must be done in agreement with the overall work context." Allen and Wilson (2004) support this as well as a result of experiences with a mobile IS for a UK police force. In both works, case studies reveal that failing to analyze mobile workers' actual work contexts leads to the unintended use of the mobile IS, or even flat refusal to use it. Lee *et al.* (2004) apply Goodhue and Thompson (1995) task-technology-fit model to explain mobile applications' performance. They find that individual user characteristics play an important role in mobile applications' adoption and resulting performance. None of these models provide recommendations on how to address

mobile applications' critical design or change management factors during their introduction.

Glissmann *et al.* (2005) propose a participative method for the design of mobile user interfaces which emphasizes the importance of involving the end-user in the design, and covers the choice of devices, client type (online vs offline vs hybrid) and integration platform according to the task requirements. Nevertheless, measures that should accompany the transformation, such as communication and employees' modified objectives, have not as yet been conceptualized.

A method for the mobilization of CRM

In the previous section, we analyzed existing works that could contribute to a comprehensive method with which to mobilize CRM. In this section, we will synthesize a comprehensive method from these approaches and fill the identified gaps by linking the different pieces. Since, change management is an ongoing task that accompanies the activities at all other BE levels, the change management aspects adapted from section four will be described within the strategy, process and ISs' perspective. Figure 1 shows an overview of the method.

Strategy perspective

To cover Zetie's (2002) first two essential requirements, we apply the approach as suggested by Schierholz *et al.* (2005). The business values to be realized by the mobilization of CRM should be derived from the general market strategy and the company's customer value proposition: one primary value proposition and one secondary should be selected. With regard to the primary proposition, the company should strive for an undisputed market leadership in customers' perception, while, it is sufficient to be better than the market average as far as the secondary proposition

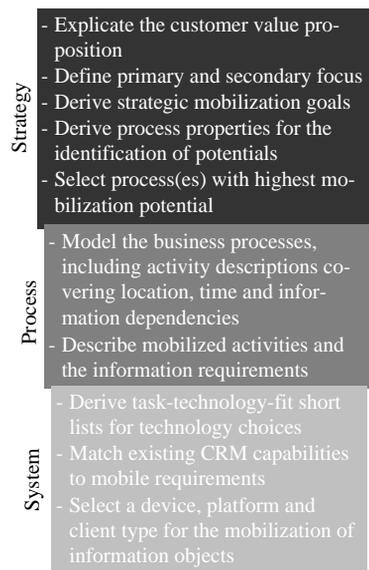


Figure 1.
Overview over the proposed method

is concerned. In all other categories, it is necessary to maintain market average. This customer value proposition must be clearly communicated to all employees in order for them to act accordingly (Colgate and Danaher, 2000). This can be achieved by explicating the market strategy as used in the framework and according to which Schierholz *et al.* (2005) classify their cases.

By following these authors' recommendations, the properties which qualify business processes for mobilization can be derived from the strategic focus. To allow for the best possible match of these goals as well as the best possible common understanding of their explication, key people from all stakeholder groups should be involved in this process as suggested by Peffers and Tuunanen (2005). This includes the general management, who sets the corporate strategy, the sales and service personnel, who will eventually have to execute the strategy using the newly designed mobile IS, and the IT management, who will be responsible for the mobile IS's implementation, operation and maintenance. Since, the customers are (or should be) the focus of all CRM activities, it would be ideal if key customer representatives could also be involved. This could prevent business models or value propositions being defined which customers do not desire or are unwilling to pay for. For obvious reasons, this will be hard to implement in mass markets though.

It should be explicitly mentioned that the values which were not chosen as primary or secondary propositions, should still be taken into consideration, because a mobile initiative might be required to maintain the market average. All the above stakeholders should define and prioritize the mobilization initiative's goals.

The final document of the strategy analysis is the explicit customer strategy, including the prioritized customer value propositions, along with a prioritized list of macro-level processes with potential for mobilization (selected according to the qualifying properties identified by Schierholz *et al.* (2005)).

Business process perspective

This prioritized list of processes for mobilization should be the input for the further business process analysis. By beginning with the strategic selection of processes, the extensive analysis and modeling of all processes in the enterprise can be avoided. We suggest using the MBPL approach as defined by Gruhn *et al.* as a methodology for the further process analysis, because its layers of abstraction allow manageable process modeling by drilling down from a rather strategic macro-level to an operational micro-level (Gruhn and Book, 2003; Köhler and Gruhn, 2004). We do suggest, though, including stakeholders from the operational business unit and IT staff in the business processes' modeling and in the identification of mobilization potentials. This is to prevent potentials from being overlooked due to the high-abstraction layers in the beginning. Consequently, staff members who are operationally involved in the processes should have an in-depth knowledge of the processes and should be able to point out dependencies that are underneath a level of abstraction early enough. To encourage staff members' acceptance of newly designed processes, it appears important that they be allowed to influence the design process (Davenport *et al.*, 1996).

Beginning with a high level of abstraction, the selected business processes are modeled by using an extended standard process design language as suggested by Gruhn *et al.* The extension includes activities' location and mobility requirements as well as the dependencies between model elements (e.g. actors, activities).

Time constraints should also be modeled to allow conclusions on how up-to-date the information in the process must be, e.g. having the previous day's data could be sufficient; this would allow the nightly synchronization of data in pull communication while the requirement of real-time accuracy would require online access and possibly a push communication. Dependencies which connect elements in different locations, or with externally determined mobility (i.e. not self-chosen mobility are indicative of a mobilization potential). Mobility potentials should be modeled in increasing detail until the flow of information objects is modeled on the last level. The information objects used in these flows should then be described again, using a standard modeling language such as UML-class diagrams. These information objects also need to be connected to the ISs which handle them. Calendar entries are, for example, handled by a personal information management application as well as a corporate scheduling application while data warehouses usually hold customer master data.

Once potentials have been identified, the involved information objects and ISs can be assumed to be mobile, and activities bridging the dependencies can be removed from the process. If, for example, an existing process involves a sales agent who begins his work day by picking up the latest customer histories as well as his daily schedule at the office, visits the customers on his schedule, makes appointments with them, modifies contracts, signs new contracts, etc. and finally returns to the office to enter the modified and new data into the enterprise systems, there are dependencies between the "visit customer" activity and the "customer histories" information objects, while the "visit the office" activities are bridging activities. By mobilizing the information objects, the bridging activity could be eliminated.

The value of this mobilization potential should also be assessed in cooperation with the employees who are involved in the modified processes. The mobilization's value lies in different dimensions (Clarke, 2001). It is possible that not all of these values could be easily converted into a financial benefit. The involved employees' inputs should therefore be used to prioritize the potentials relatively. Furthermore, the values' priorities should be matched with the strategic goals from the analysis described above.

The final document of the process analysis stage should be a prioritized list of modified processes that includes the models as well as a detailed description of the newly designed activities (using the framework in Table III), the affected ISs and the required functionality within these ISs. Ideally, an explicit list of the modifications made should be compiled.

Information systems perspective

The description of the new mobile activities, as well as the information objects and IS functionality should be the input for the system design or system choice stage. In many cases, there will be some form of CRM system for stationary use, since a mobile CRM initiative is unlikely to be the first step in CRM. Consequently, the design of a mobile IS for CRM is usually the extension of an existing IS with a mobile interface. This is exactly the goal of the generic method developed by Glissmann *et al.* (2005), which now needs to be customized for CRM and connected to the process analysis described above.

As a first step, Glissmann *et al.* (2005) suggest a requirements analysis to identify the mobile users, their personalization needs (e.g. a sales agent might want an overview of only those customers for whom he is responsible) and their information needs.

These data could be taken directly from the documents produced in the business process analysis. Subsequently, the conceptual design includes decisions about the devices as well as the client type. These are dependent on the mobility and “wireless-ness” classification as well as the mobile activities’ time constraints as specified in the process analysis. A high degree of mobility, for example, requires small devices which allow single-hand use to enable usage on-the-go. Time constraints have an impact on the decision whether online access is required, or whether scheduled synchronization is sufficient. The activities’ location properties also influence both the device selection (e.g. in certain rough locations a ruggedized device is necessary) and the type of software client (e.g. in remote locations cellular or even W-LAN networks are not available, which therefore requires offline use of software). Finally, the physical design must take the information flows as described by the process analysis into consideration and must match these to produce user interfaces specifically geared towards the activities that are to be supported. With mobile devices’ typically limited input/output capabilities, certain functions’ low complexity and high specificity specifically lead to the user interface’s good task-technology-fit.

Both the device and platform decision gain another level of complexity if the mobile IS under design targets consumers or other people external to the implementing company. Usually, there are no policies or standards governing these users’ choice of device or platform, which means that the client software is required to support virtually all devices and platforms available on the market, both now and in the foreseeable future. A customer would most probably be very dissatisfied if a service which he has subscribed to is not available on his device and/or platform, and a MM campaign’s effectiveness would be very limited if only a certain device or a certain platform is supported. In such cases, it is therefore highly recommended to focus on providing the client using widely available standards such as mobile e-mail, an short message service (SMS) service, mobile browsers, or the micro edition of the Java industry standard (J2ME).

Similarly, constraints regarding choices increase if the stationary CRM solution is based on a standard product such as SAP, Siebel or Microsoft. These products all have a mobile edition which offers a standard set of features. The customization options are, however, far more restricted. This problem has already been noted in the literature on the sourcing of IT services, both in general contexts as well as specifically in the CRM context. If standard software is deployed, it is highly recommendable to adapt the processes as intended by the standard software vendor, since the costs of customization might exceed the benefits of cheaper standard software in these cases.

During the design and implementation, we again highly recommend that end-users should be frequently involved in the early stages, e.g. by doing usability tests with early prototypes. The details of knowledge-intensive activities, which are also characteristic of CRM, are especially difficult to describe in a few structured attributes, thus the task-technology-fit and a mobile IS’s suitability for these activities can best be estimated by the people who actually perform these activities (Haugset, 2004).

Summary

The synthesized method that we presented in section four covers all aspects of the BE research framework. The method provides a framework for the analysis of corporate strategies and the derivation of goals for a mobile initiative and links them to a

goal-oriented business process analysis method. This method extends existing business process analysis methods with mobility-specific aspects and identifies mobilization potentials in process and IS design. The output of the business process analysis is used as the input for a conceptual and physical system design, for which a structured procedure model is also presented.

The proposed method focuses on the analysis and design of business processes and activities as well as the corporate benefits which can be realized by their mobilization. Nevertheless, the method could be applied to mobilize consumer services as well. Then different considerations should be taken into account when choosing devices and platforms, since a wider variety has to be supported. This speaks in favor of the use of “least common denominator” standards such as SMS (currently) or MMS (in the near future). Figure 2 shows an overview of the benefits of the proposed method.

Conclusions and further research

In this paper, we analyze a multitude of approaches in the field of mobilizing business processes, focusing on their applicability and application in the CRM context. The method helps business managers to design mobile CRM solutions which are in line with the goals defined by the corporate strategy. By applying this method, the risk of mobile initiatives in the CRM context is reduced, since it provides a structured and consistent procedure for the definition of goals, the identification of potentials for the fulfillment of these goals as well as recommendations for the systematic exploitation of these potentials. The application of this structured method should avoid the pitfalls of technology-driven IT initiatives which various companies have experienced, particularly with mobile technologies.

Further, research should increase the described method’s level of detail in order to ensure a recipe-like applicability in a business context. The activities on each level should be broken down into further detail and the output documents of each step should be described in a template-like manner. Further research should also provide sample questionnaires for interviews with end-users and documentation templates for the analysis results, e.g. based on the description framework for the processes and activities (Table III). Decision criteria should also be compiled for the design decisions to ensure a more stable and faster application of the method.

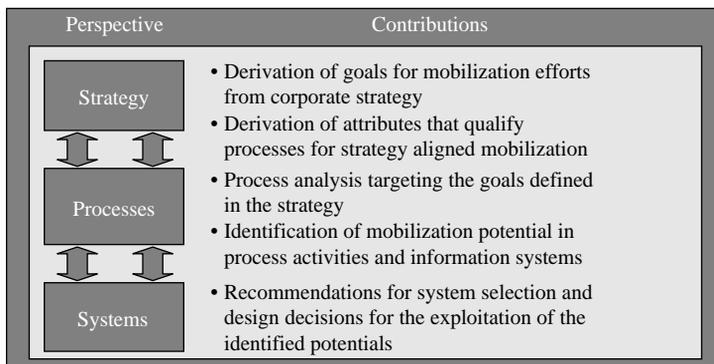


Figure 2.
Benefits of the proposed method

Finally, in accordance with the design science research approach, the method requires evaluation. This evaluation should demonstrate the utility, quality and efficacy. Design science theory suggests multiple methods for the evaluation of designed artifacts. In order to cover all the required elements of a mobile IS design process in the CRM context, the evaluation should specifically cover the method's organizational fit, usability in transformation projects as well as its completeness and consistency. We suggest that the method be evaluated by means of case studies in which a transformation of CRM occurs in order to adapt to the mobile world. Alternatively, detailed scenarios could be constructed in which the utility and applicability of the method could be demonstrated.

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Further reading

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