Handbook of Research in Mobile Business:
Technical, Methodological, and Social Perspectives

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in that collaboration. While collaborations hold the promise for global reach in a connected economy, there is a need to have a formal approach to transforming those organizations to mobile collaborative organizations. Mobile transformation was proposed by the author in the previous edition of this book. In this chapter, Marmaridis does an excellent job of presenting a research-based methodology for mobile collaboration (M-Collaboration). This chapter examines the challenges of mobile collaborations including trust, engagement, and interaction. This chapter provides the reader with a comprehensive understanding of mobile collaboration in the SME space and a field-tested mobile collaboration methodology for SME transformations.

Chapter IV

The authors in this chapter, discuss one of the most significant aspect of mobile technologies – that of "context". While mobility is touted as the key technology that enables location-independence, this value of this location-independence to a user is based on his or her context. It is the context that makes a mobile application relevant to the user. This chapter takes the reader through a definition and discussion on what is implied by context and how context can be used in mobile systems. The challenges to context-aware mobility management are discussed next and the existing solutions to those challenges are surveyed. However, the authors then present their own architecture for handling context in mobile solutions.

Chapter V

Location-based services (LBS) through the use of mobile technologies in business are based on the ability of mobile technologies to be able to provide value at a specific location of the user. The popularity and utility of LBS has lead to phenomenal technological infrastructure including networks, applications, and processes. However, at the same time, there are increasing challenges emerging due to the operational models of cellular network operators. These operational models provide competition between the operators, service providers, and enablers. Therefore, even though the customers are increasingly interested in location services, their uptake is stunted due to the competitive operational models of the network operators and service providers. Harmon and Daim do an excellent job, in this chapter, of evaluating the future of location-based services through a discussion and critical assessment of mobile technologies, service provision, mobile applications, the current market trends, and the issues related to strategic approaches in application of mobility in business.

Chapter VI

Mobile enterprises adopt mobile technologies in a strategic manner. This adoption of mobility by enterprises, however, needs to follow a process. A mobile enterprise transition framework provides this process for transition that is based on the meticulous consideration of the factors that affect transition. This chapter outlines a Mobile Enterprise Transition (MET) framework, for transitioning an organization to a mobile organization that is based on the dimensions of economic, technology, process, and sociology. These four dimensions for MET have been identified based on an understanding of people, processes, and technologies, and developed further as a comprehensive framework based on a detailed research project undertaken by the author. The purpose of this MET framework is to provide guidance and support that increases the chances of the transition's success as well as ameliorate associated risks.

Mobile collaboration is of ever increasing importance to business. Web Services (WS) technologies create the potential for an organization to collaborate with partners and customers by enabling its software applications to transact over the Internet. Mobile Web Services (MWS) take this collaborative ability of businesses a step further by making it location-independent. A vital element of this transition of organizations to collaborative organizations is a mobile process. A mobile process makes use of MWS as well as a mobile-enabled Service Oriented Architecture (SOA) for the enterprise. This chapter describes how the existing business processes of an organization are transitioned in to collaborative business processes that would result in a mobile Collaborative Web Based System (CWBS). This incorporation of MWS in a collaborative system happens at three interrelated yet distinct layers: policies, activities, and standards. This chapter develops these ideas and also presents the validation of these ideas through an action-research carried out by the authors in a large energy supplier organization in Melbourne, Australia.

Mobile technologies result in a collaborative business environment in which the businesses are able to interact with each other in a location-independent manner. The business processes based on mobile technologies need to be modelled, studied, and optimized in order to create value to the collaborative businesses. This chapter describes an action research study in a security organization wherein the impact of mobile technology is studied and validated for collaborative business processes in a security business. The chapter, thus, describes a Collaborative Web Based System (CWBS) that is specific to the security organization. Furthermore, this chapter also highlights the shortcomings of the existing security related processes and how they can be improved with mobility.

The Internet wave that swept through business is likely to be seen as a ripple in a pond compared to the changes that are predicted from the adoption of mobility into business. Irrespective of industry sector, the mobile enablement (wrapping business around mobility) of business is expected to bring many opportunities and rewards; and like the Web enablement (wrapping business around the Internet) of business, a few challenges as well. Across all business areas, mobile business will need to support a mobile workforce, the operation of call (service) centres, and transaction processing and collaboration of virtual teams. Mobile business will also impact product offerings, the management of consumer choice and the focusing of communications with a sticky message. Mobile business will drive changes in management, revisions of business operations and the alignment of Information Communication Technology (ICT). This chapter discusses some of the common but important strategic elements to the successful mobile enablement of business.

Chapter X

Mobile business strategies help businesses make optimum use of mobile technologies as the prevent over spending or under utilization of the potential of mobile applications. A mobile strategic framework, as described in this chapter, provides the businesses with the necessary guidance in terms of approach, adoption, and operation of mobile applications. This chapter also discusses examples of mobile solutions which have been implemented in hospitals, retail Supply Chain Management (SCM) and in Customer Relationship Management (CRM). The mobile framework discussed here by Pg Hj Ali and Atkins is an extension of existing Intranet, Extranet, and Internet e-business application with mobility.

Chapter XI

Mobile computing is getting more and more attention these days, but the fact that there is still inadequate source of methodology to support mobile development, triggers the interest in this study to explore issues related to mobile development methodologies. The mobile developers are facing formidable challenges in the development of mobile application due to the specific demand and technical constraints of mobile environment. Selecting a suitable development methodology is believed to be the key answer to all these issues. Thus, this study aimed to propose a solution to resolve the issues. A decision matrix based on Pugh method was constructed to assist mobile developers especially the novices, to choose the methodology that suits the requirements of their mobile development projects. In order to rate the usefulness of the constructed matrix, an electronic version of the matrix was designed and developed, called md-Matrix. Detail descriptions of the processes involved in constructing the matrix and designing the electronic version of the constructed matrix are also described. Analysis of data gathered from a questionnaire given after the test of md-Matrix shows that participants fairly agreed that md-Matrix is useful in helping them to develop a mobile application.

Chapter XII

Studies on the use of mobile payment (m-payment) method for buying electronic book (e-book) are very scarce, possibly not yet available. Consequently, a study was undertaken to accomplish the main aim of proposing an m-payment model for marketing and purchasing e-books. A number of process flow models are proposed to serve as diagrammatic representations of the process models that are of concerned. The models clearly specify all the entities involved, such as Telco, merchants, buyers, and e-book providers, and how the data and transactions, are flowing from one entity to another. The processes of browsing, buying, and downloading e-books are also documented. In validating the process flow models, two prototypes, a WAP and WEB environments, were developed and tested to assess the model and system acceptance rating. Key findings indicate that m-payment is the most preferred payment method for buying e-book in higher learning institutions and the acceptance factors of such technology were found to be on the high and positive side.

Section II: Sociology and Culture

While Web services provide the opportunity to integrate various processes, mobile technologies create the opportunities to personalize them. This composite process-personalization (CPP) is nicely discussed in this chapter by Sadashivam and Tanik. In addition to the technical challenges, the CPP also addresses the need to model and integrate the interaction workers who drive the business processes. The chapter here outlines an agent-based approach to composite services development and demonstrates that approach in practice through a case study.

The "disruptive" nature of mobile technologies implies significant impact on the cultural aspects of a society. Conversely, the culture that is made up of the needs, beliefs and norms of a society also impact the usage of mobility. This chapter by Wagner and Klaus studies this significant cultural aspect of mobility by highlighting cultures' differences and their consequences for the diffusion of mobile technologies in business and society, as well as its acceptance in mobile direct marketing and mobile commerce.

The usability aspects of mobile gadgets play a crucial role in their acceptance by the users. Furthermore, this challenge of usability is exacerbated by the ongoing integration and convergence between mobile and wired networks and services. For example, the available bandwidth of a wireless connection, Web navigation on a wireless application and the various input-output methods for such applications are all part of the usability challenges of mobility – especially if the mobile applications are being offered on a common integrated platform. This chapter by Gurau takes a research-based approach in studying the challenges in terms of usability faced by mobile gadget users. The survey conducted for this chapter is based in the city of Montpellier in France.

Personalization of mobile devices opens up the gates for direct and focused marketing for businesses. Promotion of products and services has, thus, undergone a major revolution – with the mobile technologies providing appealing interfaces and presentations based on timing and location of the user. However, there is also a need to balance these advantages with the potential rejection and backlash by the customers if they consider this as an intrusion of their privacy. Wagner and Klaus discuss and demonstrate, with examples, this interesting aspect of direct marketing by businesses based on the mobile device usage in this chapter.

Chapter XXVI

The chapter presents an excellent analysis of the influence of mobile user experience, ICT ownership, Mobile affinity, and Mobile Commerce compatibility in the Mobile-Commerce adoption processes. This chapter is based on an empirical study of 470 mobile users in the context of the Spanish market.

Chapter XXVII

Mobility and the Internet have revolutionized the tourism industry leading to novice ways of utilizing these communications medium, such as medical tourism discussed elsewhere in this handbook. This particular chapter by Guzzo, Ferri, and Grifoni outlines the use of mobile and Web technologies in coordinating a travel plan. For example, through a combination of mobile Web, the potential traveler can search for various options for his or her travel, plan the travel, buy the tickets, and actually undertake the travel with the potential for dynamically changing the travel plan. This chapter is thus an excellent addition to the discussion on the social implications of Web applications and mobile devices and how they positively impact the attitude of the customers that can result in sustainable tourism.

Chapter XXIII

Trust is, by far, the most important social aspect in adoption of mobility. This chapter by Karjaluoto and Kautonen goes deeper into this issue of trust that affects the consumers' desire to offer their personal data in mobile marketing. This discussion in this research-based chapter is based on a sampled survey of 200 young Finnish consumers of mobility that lead the authors to conclude that the main source of trust affecting the consumers' decision to participate in mobile marketing is the company's media presence, rather than personal experiences or social influence.

Chapter XXIX

Mobile virtual communities affect all dimensions of life including education, travel, governance, and healthcare. This chapter is based on the impact of mobile virtual communities in the healthcare arena. Mobile virtual healthcare communities are the hub of information exchange amongst patients and physicians. This information sharing is helping in providing pre- and post-event support for the patients as well as exchange of relevant information amongst doctors and other healthcare professionals – as discussed here.

Chapter XXX

Amongst the wide-ranging impacts of mobility on society, adolescents form a special and significant part. The authors in this chapter discuss this impact of mobility on the adolescent social structure including the parents, the teachers, peers/friends, and the young adolescents themselves. This chapter is based on a small research project to ascertain the views of the adolescents and the teachers of young adolescents within the Indian context.

This chapter discusses the mobile network as a new medium for marketing communications. It illustrates that the mobile medium, defined as two-way communications via mobile handsets, can be utilized in a company's promotion mix by initiating and maintaining relationships. First, by using the mobile medium companies can attract new customers by organizing SMS (short message service) -based competitions and lotteries. Second, the mobile medium can be used as a relationship building tool as companies can send information and discount coupons to existing customers' mobile devices or collect marketing research data. The authors explore these scenarios by presenting and analyzing a mobile marketing case from Finland. The chapter concludes by pondering different future avenues for the mobile medium in promotion mix.

Wireless Technology is growing at a phenomenal rate. Of the many present challenges highlighted by the author, increased security is one of the main challenges for both developers and end users. This chapter presents this important security aspect of implementing a mobile solution in the context of Sydney International airport. After tackling initial challenges and issues faced during the implementation of wireless technology, this chapter demonstrates how security issues and wireless application were implemented at this mobile-intense airport organization. The decision to deploy and manage the wireless spectrum throughout the Airport campus meant that the wireless LAN had to share the medium with public users, tenants and aircraft communications on the same bandwidth. Therefore, this case study also demonstrates invaluable approach to protect unintended users from breach of existing security policies adopted by their corporate network. Authentication and data privacy challenges, as well as complete WLAN connectivity for tenants, public and corporate usage is presented in this case study.

Channel estimation is a technique to understand and optimize the behaviour of a communications channel. Identifying and improving on the accuracy of channel estimation can improve system performance in a wireless environment that can result and fast and reliable communications. This chapter discusses the critical and limiting challenges of communication channels and approaches to addressing them, such as the SISO estimation.

incorporate transaction capabilities. An example Customer Relationship Management (CRM) is shown in use of the framework.

Chapter XXXVIII

One of the biggest challenges in future application development is device heterogeneity on varying mobile networks. This chapter presents a prototype for secure and reliable computing that addresses the issues and challenges in building multi-platform mobile applications that can run on heterogeneous devices. Furthermore, this chapter also describes how to allow a user to move/migrate a running application among heterogeneous devices that might be operating among different networks.

Chapter XXXIX

Next generation telecom networks will be having convergence of the so called "Quad" functions voice, data, TU, and streamity on IP based mobility solutions. Mobile IP is a TCP/IP-based protocol that has been standardized by the IETF (Internet Engineering Task Force) for supporting mobility. Mobile IP is part of both IPv4 and IPv6 standards. Mobile IP works at network layer (layer 3), influencing the routing of packets and can easily handle mobility among different media. This chapter discusses different technical operations involved in Mobile IPv4 and Mobile IPv6 and compares them.

Chapter XL

This chapter aims to investigate and expand the role of mobile technologies in an Environmentally Responsible Business Strategy (ERBS). An ERBS with mobile technologies has the potential to help organizations achieve socially responsible goals of reducing green house emissions, reducing physical movement of men and materials, and recycling materials. This chapter delves deeper into the role of mobile technologies in creating and enhancing what can be considered as Environmental Intelligence (EI) – extending business intelligence with mobility for a Green enterprise.

Chapter XLI

The majority of enterprises use Enterprise Resource Planning (ERP) software to improve their business processes. Simultaneously, mobile technologies which can be used within ERP have gained further importance. This is so because ERP, together with mobile technologies, offers a wide spectrum of synergies and have a significant impact on enterprise efficiency. The improvement possibilities in ERP due to mobility range from sales activities, over logistic processes, up to effects on the human resource management.

A sensor network consists of tiny, low-powered, and multifunctional sensor devices and is able to perform complex tasks through the collaborative efforts of a large number of sensor nodes that are densely deployed within the sensing field. Maintaining connectivity and maximizing the network lifetime are among the critical considerations in designing sensor networks and its protocols. Conservation of limited energy reserves at each sensor node is one of the greatest challenges in a sensor network. It has been suggested that mobility of some nodes/entities in a sensor network can be exploited to improve network performance in a number of areas, including coverage, lifetime, connectivity and fault-tolerance. In this context, techniques for effectively utilizing the unique capabilities of mobile nodes have been attracting increasing research attention in the past few years. In this chapter, the authors will focus on some of the new and innovative techniques that have been recently proposed to handle a number of important problems in this field. They will also present a number of open problems and some developing trends and directions for future work in this emerging research area.

In commercial cellular networks, like the systems based on direct sequence code division multiple access (DSCDMA), many types of interferences can appear, starting from multi-user interference inside each sector in a cell to interoperator interference. Also unintentional jamming can be present due to co-existing systems at the same band, whereas intentional jamming arises mainly in military applications. Independent Component Analysis (ICA) use as an advanced pre-processing tool for blind suppression of interfering signals in direct sequence spread spectrum communication systems utilizing antenna arrays. The role of ICA is to provide an interference-mitigated signal to the conventional detection. Several ICA algorithms exist for performing Blind Source Separation (BSS). ICA has been used to extract interference signals, but very less literature is available on the performance, that is, how does it behave in communication environment. This needs an evaluation of its performance in communication environment. This chapter evaluates the performance of some major ICA algorithms like Bell and Sejnowski's infomax algorithm, Cardoso's Joint Approximate Diagonalization of Eigen matrices (JADE), Pearson-ICA and Comon's algorithm in a communication blind source separation problem. Independent signals representing Sub-Gaussian, Super-Gaussian and mix users are generated and then mixed linearly to simulate communication signals. Separation performance of ICA algorithms measure by performance index.

This chapter describes a case study on installation of a Wi-Fi network in a chemical manufacturing company in India in order to connect its various dispersed manufacturing units, as well as the administrative offices. Initial studies indicated that a physical network was not appropriate due to the local corrosive chemical environment; the author's company was invited to install Wi-Fi network within the complex. This chapter reports on how the project progressed, the lessons learnt and the way to approach this kind of work in future in terms of wireless networking.

This chapter explains the results of an action research carried out at ImpexDocs in Sydney, Australia. The purpose of this action research is to investigate the business processes of the Export Companies that collaborate with the organizations involved in customs in Australia. The chapter provides an insight into applications of Collaborative Business Process Engineering (CBPE) in terms of improving the effectiveness and efficiency for all organizations involved in custom (especially export). The study demonstrates an understanding of the depth analyses of existing business processes under development investigates the collaboration between the export companies system with other enterprises involved, investigates the existing channels of collaboration and the common business processes threads that run thru multiple applications.