

The New Corporate Mobile IT: Understanding the Second Generation of
Enterprise Mobility and the Influence of Organizational Culture

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This work is dedicated to them.

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Thomas Sammer

Zusammenfassung

Diese Dissertation untersucht Mobile IT, ein Phänomen, das unseren Alltag zunehmend erleichtert, aber auch herausfordert. Seit etwa 2010 haben mobile Geräte wie Smartphones und Media Tablets eine neue Reife erreicht und dazu beigetragen, dass IT-Innovationen zunehmend im Consumer-Markt entstehen und sich erst anschliessend auf Unternehmen ausbreiten. Dieser Wandel des Consumer-Markts zur primären Quelle für IT-Innovation ist eine bedeutende Herausforderung für den Einsatz von IT in Unternehmen.

Die Dissertation besteht aus fünf Beiträgen und fokussiert sich auf den Einfluss von mobiler Consumer-IT auf Unternehmen. Beitrag A schafft ein Verständnis zu den wichtigsten Begriffen und Technologien. Die Beiträge B, C und D erforschen auf unterschiedlichen Beobachtungsebenen (Projekt-, Organisations- und Interorganisationsebene) die Auswirkungen von mobiler Consumer-IT auf Unternehmen. Basierend auf dieser explorativen Arbeit wurden Erkenntnisse über das Phänomen gewonnen und ein neuer Begriff, der die Auswirkungen der mobilen Consumer-IT auf Unternehmen charakterisiert, entwickelt: Second Generation Enterprise Mobility (SGEM). Die Beiträge B, C und D haben zudem dazu beigetragen, die Unternehmenskultur (OC) als einen wichtigen Faktor, der beeinflusst, wie Unternehmen SGEM annehmen, zu identifizieren. Darauf aufbauend entwickelt und testet Beitrag E Hypothesen, die den Zusammenhang zwischen verschiedenen Arten von OC und dem Einsatz von SGEM in verschiedenen Bereichen der Wertschöpfungskette (VC) beschreiben.

Die Ergebnisse zeigen, dass unabhängig von der Beobachtungsebene verschiedene Auswirkungen durch SGEM auf Unternehmen existieren. Unternehmen mit einer extern orientierten OC tendieren dazu, SGEM in den externen Bereichen der VC einzusetzen, wohingegen Unternehmen mit intern orientierter OC SGEM tendenziell in internen Bereichen der VC einsetzen. Demnach können Entscheidungen zum Einsatz von SGEM durch die OC beeinflusst sein und zu einer ungleichen Verteilung von SGEM-Anwendungen über die Wertschöpfungskette führen.

Abstract

This thesis examines mobile IT, a phenomenon that increasingly eases but also challenges our everyday lives. Since 2010, devices with a new maturity level such as smartphones and media tablets gained increasing success. Accompanying this success was a tendency for IT innovation to emerge in the consumer market and spread to organizations and corporations. This change in consumer markets as the primary source of IT innovation is a major IT industry shift, challenging the way organizations innovate and adopt IT. This thesis focuses on the influences mobile consumer IT has on corporations.

Five contributions comprise this thesis. Contribution A lays out a common understanding of important terms and technologies related to mobile IT. Contributions B, C, and D explore the impact of mobile consumer IT on corporations at various levels of observation, namely, the project, organizational, and inter-organizational levels. Based on this exploratory work, new knowledge concerning the phenomenon was gained, and a new term that characterizes the impact of mobile consumer IT on corporations was developed: Second Generation Enterprise Mobility (SGEM). Contributions B, C, and D yield implications that organizational culture (OC) is an important factor that influences how corporations adopt SGEM. Following these implications, contribution E develops and tests hypotheses that define relationships among various types of OC and adoption of SGEM in parts of the value chain.

This study demonstrates that independent from the level of observation, SGEM has implications for corporations. Results show that companies with an externally oriented OC adopt SGEM in external parts of their value chain, and internally oriented companies adopt them in internal parts. This suggests that OC influences management decisions concerning the area of application of SGEM, and, hence, lead to unequal adoption of SGEM across the value chain.

Contributions

Contribution A:

Sammer, Thomas; Walter, Thomas (2012), Das mobile Web 2.0 im Unternehmen, in Andrea Back, Norbert Gronau, Klaus Tochtermann (Hrsg.) Web 2.0 und Social Media in der Unternehmenspraxis, 3. Auflage, Oldenbourg, München, p. 91-100.

Contribution B:

Sammer, Thomas; Vögeli, Sandro; Back, Andrea (2013), Success and Failure: Two Longitudinal Case Studies on Media-Tablet Usage in CRM, in Proceedings of the 12th International Conference on Mobile Business (ICMB), Berlin, Germany, June 2013.

Contribution C:

Sammer, Thomas; Brechbühl, Hans; Back, Andrea (2013), The New Enterprise Mobility: Seizing the Opportunities and Challenges in Corporate Mobile IT, in Proceedings of the 19th Americas Conference on Information Systems (AMCIS), Chicago, USA, August 2013.

Contribution D:

Sammer, Thomas; Lazur, Christian; Walter, Thomas; Back, Andrea (2012), Barrieren am Weg zum Mobile Contactless Payment: Eine Marktanalyse und Bestandsaufnahme der Situation in der Schweiz, in GI-Edition Lecture Notes in Informatics (LNI), P-202.

Contribution E:

Sammer, Thomas (2013), Why is there Variation in the Nature of Organizational Mobile IT Adoption? An Empirical Study of the Influence of Organizational Culture on Organizational Mobile IT Adoption, in Proceedings of the 12th International Conference on Mobile Business (ICMB), Berlin, Germany, June 2013.

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Table of Acronyms

Abb.	Abbildung
AVE	Average Variance Extracted
B2B	Business to Business
B2C	Business to Customer
CEO	Chief Executive Officer
CIO	Chief Information Officer
C-Level	Chief-Level / Executive-Level
Comp. Rel.	Composite Reliability
CR	Customer Relations
CRM	Customer Relationship Management
CSS	Cascading Style Sheets
CVM	Competing Values Model
DACH	Germany, Austria, and Switzerland
DC	Developmental Culture
eCommerce	Electronic Commerce
ERP	Enterprise Resource Planning
Fig.	Figure
FIMIX-PLS	Finite Mixture Partial Least Squares (method)
GC	Group Culture
GPS	Global Positioning System
H	Hypothesis

HC	Hierarchical Culture
HTML	Hypertext Markup Language
IS	Information System
ISR	Information Systems Research
IT	Information Technology
ITU	International Telecommunication Union
MBS	Mobile Business Solution
mCommerce	Mobile Commerce
MCP	Mobile Contactless Payment
NFC	Near Field Communication
OC	Organizational Culture
p	p-value (Statistics)
PDA	Personal Digital Assistant
PHP	Hypertext Preprocessor
PLS	Partial Least Squares (Regression)
PO	Production and Operations
PPS	Process Planning and Support
PSE	Product and Service Enhancement
QDA	Qualitative Data Analysis
R	R-Value (Statistics)
R2	R squared (Coefficient of Determination, Statistics)
RC	Rational Culture
RQ	Research Question

SBB	Schweizerische Bundesbahnen
SE	Secure Element
SEM	Structural Equation Model / Modeling
SGEM	Second Generation Enterprise Mobility
SIM	Subscriber Identity Module
SMS	Sales and Marketing Support
SQL	Structured Query Language
SR	Supplier Relations
STDEV	Standard Deviation
T-Stat	T-Statistics
uCommerce	Ubiquitous Commerce
UI	User Interface
USA	United States of America
VC	Value Chain
VP	Vice President
WLAN	Wireless Local Area Network
WTT	Wiki Talking Tours

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Part A

1 Exposition

*“The most profound technologies are those that disappear.
They weave themselves into the fabric of everyday life
until they are indistinguishable from it.”*

Marc Weiser

1.1 Introduction and Motivation

Information technology (IT) emerged over the last few decades as one of the most critical resources for organizations¹ to create value (El Sawy, Malhotra, Gosain, & Young, 1999; Kohli & Devaraj, 2004; Radhakrishnan, Zu, & Grover, 2008), and led to the transformation of products, processes, companies, industries, and competition itself. Painful structural shifts experienced by the music, film, and publishing industries are testaments to the transformative force of IT innovation (The Economist, 2012). Advancements in IT occurred in cycles, starting with mainframe computing, evolving into the personal computer, and finally to mobile IT, the fifth computing innovation cycle in the last 50 years of IT history (Meeker, 2011). Mobile IT emerged as one of the most important topics for corporations and CIOs (Cearley & Claunch, 2012; Jones, 2013; Lovelock et al., 2013).

Actually, **Mobile IT** is a subgroup of IT, representing the latest technological advancements of IT by making them portable (Hong Sheng, F. F.-H. Nah, & Keng Siau, 2005), including devices such as smartphones and tablet computers. However, concerning its impact, it is far more wide reaching. Mobile IT is not only a technological advancement due to increased mobility, it also drives a social phenomenon by extending the presence of IT into everyday lives. In contrast to previous eras, people no longer leave computers behind when they leave a desk (Y. Yoo, 2010). IT devices such as smartphones are always with the user, much like door keys and wallets, omnipresent in daily routines.

¹ We use “organization” as a synonym for corporations, which are also organizations (corporation = organization).

Therefore, mobile IT made computers an integrated and important part of life. As Marc Weiser argues (M Weiser, 1991), “The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it.” This development represents a socio-technological transformation that influences both individuals and organizations, and creates new opportunities and challenges for most elements in society and the economy. Both practitioners and scholars confirm this view and predict that **mobile IT will continuously reshape the future** (Basole, 2008; Kontzer, 2012; Kalle Lyytinen & Y. Y. Yoo, 2002; Scornavacca & Barnes, 2008; Sørensen, 2011; Tilson, K. Lyytinen, & Sorensen, 2010; Vodanovich, Sundaram, & M. Myers, 2010; Mark Weiser, 1993a; Y. Yoo, Henfridsson, & Kalle Lyytinen, 2010).

A primary driver of this development is the **accelerating diffusion of mobile IT** since the turn of the century (Ladd, Datta, Saonee Sarker, & Yu, 2010; M. Lee & Cho, 2007). For example, the International Telecommunication Union (ITU²) reports that in 2013, the number of mobile-cellular subscriptions (6.8 billion) nearly matches the world’s population (7.1 billion). It further reports that mobile-cellular penetration stands at 96% globally, 128% in developed countries, and 89% in developing countries. Concerning access to the Internet, it reports that in 2013, 40% of the world’s population has Internet access. A major force behind this development is mobile IT and the fact that mobile-broadband subscriptions climbed from 268 million in 2007 to 2.1 billion in 2013 (ITU, 2013). South Korea, Japan, Sweden, and Australia have mobile broadband market penetration of more than 80% (ITU, 2011), and in January 2012, more than 8% of all website page views came from mobile devices (StatCounter Global Stats, 2012). In the near future, mobile broadband penetration will likely reach levels comparable with mobile-cellular penetration rates.

This remarkable diffusion of mobile IT causes **substantial global business impact**, influencing existing and creating new markets. For example, Gartner

² The ITU is a special agency of the United Nations responsible for information and communication technologies.

predicts that mobile ad revenue will be US\$ 3.3 billion in 2011, and grow to US\$ 20.6 billion by 2015 (Baghdassarian & Frank, 2011). For its 2011 Q3 earnings, Google reported that annual revenue from mobile advertising was over US\$ 2.5 billion per year (Seeking Alpha, 2011). For 2013, Google's earnings from mobile advertising are forecasted to reach US\$ 8.85 billion (emarketer.com, 2013). Major changes are also occurring in the software development industry. For example, ABI Research estimates that apps will generate US\$ 25 billion in 2013 (ABI Research, 2013), and Gartner forecasts that total sales for mobile applications will overtake total sales of ERP³ software in 2013 (Finley, 2011). Major changes can also be expected in many other industries, and society as a whole (Basole, 2008; Ladd et al., 2010).

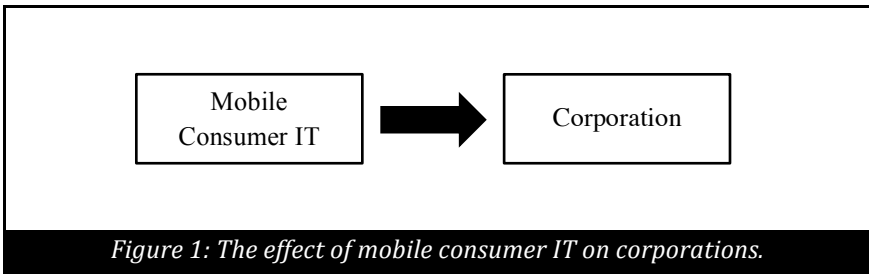
However, following the latest discussions on mobile IT, one could believe that this is a major topic only due to the market successes of novel consumer products (e.g., Apple's iPhone and iPad). Indeed, these products leveraged market penetration, especially for smartphones and tablet computers, but comparable products have been available to organizations and customers for several years, even before the recent hype. Focusing on adoption of mobile IT in organizations, many organizations recently started to develop their first customized software applications for smartphones and tablet computers while other organizations have been using comparable solutions for several years. For example, many organizations are now adopting applications to support sales staff with media tablets; other organizations have been using tablet computers for comparable applications since the early 2000s (Myron, 2004; Walker & Barnes, 2005). Similar observations can be made for the adoption of personal digital assistants (PDAs) and smartphones (Walker & Barnes, 2005).

One reason could be that both academicians and practitioners are **struggling to understand how mobile IT increases the overall business value of an organization**, as Ladd et al. demonstrate in a literature review of 806 articles published between 2000 and 2009 (Ladd et al., 2010). Innovative use **and adoption of mobile IT are not driven primarily by corporate use**, but by the

³ Enterprise Resource Planning. Important vendors are SAP, Oracle, and Microsoft.

consumer market. Most successor products in mobile IT use hardware and software designed for consumers, not corporations. Therefore, focusing solely on the device is not the answer to understanding why corporations adopt mobile IT disparately, leading to questions regarding **what factors explain differences in the adoption of mobile IT among corporations?**

One aspect is how organizations react to the progress of IT consumerization. **Consumerization of IT** covers increasing demand of employees to use private equipment such as smartphones and tablets at work (Kontzer, 2012; Quaadgras & Mohammed, 2011), and consumer market-driven innovation in IT. The term refers to a tendency for IT innovation to emerge in the consumer market and spread to organizations. This change in **consumer markets as the primary source of IT innovation** is a major IT industry shift, challenging the way organizations innovate and adopt IT (Disabato, 2012; Finley, 2011; Quaadgras & Mohammed, 2011; The Economist, 2012; Wang, 2011). To understand factors that explain corporate mobile IT adoption, consumerization must be a pivotal topic. Figure 1 illustrates this effect.



To date, mobile IT adoption in corporations has been researched either very broadly or very specifically, and evidence is mixed. Findings suggest three strategic implications of mobile technology: (1) improved working process, (2) increased internal communication and knowledge sharing, and (3) enhanced sales and marketing effectiveness (Hong Sheng et al., 2005).

Thus, research evidence suggests mobile IT creates business value by increasing efficiency in task performance (Suprateek Sarker & Wells, 2003). On the other hand, there is also evidence to suggest that features leading to efficiency gains such as “always on” and anytime-anywhere computing lead, at least in the long term, to technostress and greater strain (Ayyagari, Grover, & Purvis, 2011). Other results indicate that mobile IT leads to issues related to work life balance of employees (Cousins & Varshney, 2009). Some organizations have already experienced the consequences. For example, Volkswagen agreed to stop its Blackberry servers from sending e-mails to some of its employees when they are off shift (BBC Technology News, 2011). Numerous other trade-offs also exist, from privacy to dependency issues. Thus, research evidence suggests a series of trade-offs among the benefits and drawbacks of mobile IT with which an organization must cope. The rise of consumer IT in the business context enforces these trade-offs, making it more important to explore and understand influencing factors.

However, on an organizational scale, research has so far focused mostly on strategic implications and competitive advantages of mobile IT, in general. Research concerning, in particular, mobile consumer IT remains under-researched (Ladd et al., 2010).

Therefore, the purpose of this thesis is to extend the existing knowledge base by researching adoption of mobile consumer IT in corporations.

This thesis contains several empirical studies and contributes knowledge by exploring adoption of mobile consumer IT in corporations, examining especially the influence of organizational culture (OC) on the process. The thesis contributes detailed understanding of the nature of this evolving technology in the context of organizational use, and additionally extends knowledge of the influence of organizational culture.

1.2 Thesis Structure

This thesis is the outcome of a cumulative dissertation project, comprised of two parts, A and B.

Part A, the exposition, offers an introduction on the topic and an overview of research papers included in this dissertation. Part A synthesizes the outcomes of the papers and offers a conclusion.

Part B includes the five research papers created in the course of the dissertation. Figure 2 shows the structure of the thesis, including the five research papers.

The remainder of part A is organized as follows. This section, section 1, offers an introduction to the topic, and illustrates the structure of the thesis. The research foundation is presented in section 2, including an introduction to important terms, extant literature, research questions, and research gap. Section 3 discusses the methodological approach of the contributions. Section 4 reports the results, and section 5 discusses the results and their implications for theory and practice, including limitations.

Concerning part B, the five contributions can be distinguished by their research objective. Contribution A lays out a common understanding of the important terms concerning novel mobile IT devices and applications, and contributions B, C, and D explore the topic at various levels of observation. Contribution B targets the project, C the organizational, and D the inter-organizational levels. Based on conclusions derived from these three exploratory research papers, contribution E extends them using a confirmatory approach. The exploratory contributions suggest that organizational culture is an important factor that influences the decisions and behaviors of organizations concerning mobile IT adoption. Contribution E targets this relationship and tests hypotheses that define relationships among organizational cultures and mobile IT adoptions across the value chain. The three exploratory studies (B, C, and D) establish that organizational culture is an important aspect, and confirmatory study E tests this relationship.

Contributions A through E have been published in various outlets. Contribution A was published as a book section in “Web 2.0 und Social Media in der Unternehmenspraxis, 3. Auflage”. Contributions B through E were published in the proceedings from peer-reviewed information systems (IS) conferences. Since the contributions were published in various outlets, they vary in format,

language, and citation style. To achieve consistent presentation, their templates were adapted concerning font, font size, spacing, etc. Major adjustments in the presentation were necessary concerning only reformatting of tables and figures (i.e., orientation, size, splitting of pages, etc.), but the content represents the original publication.

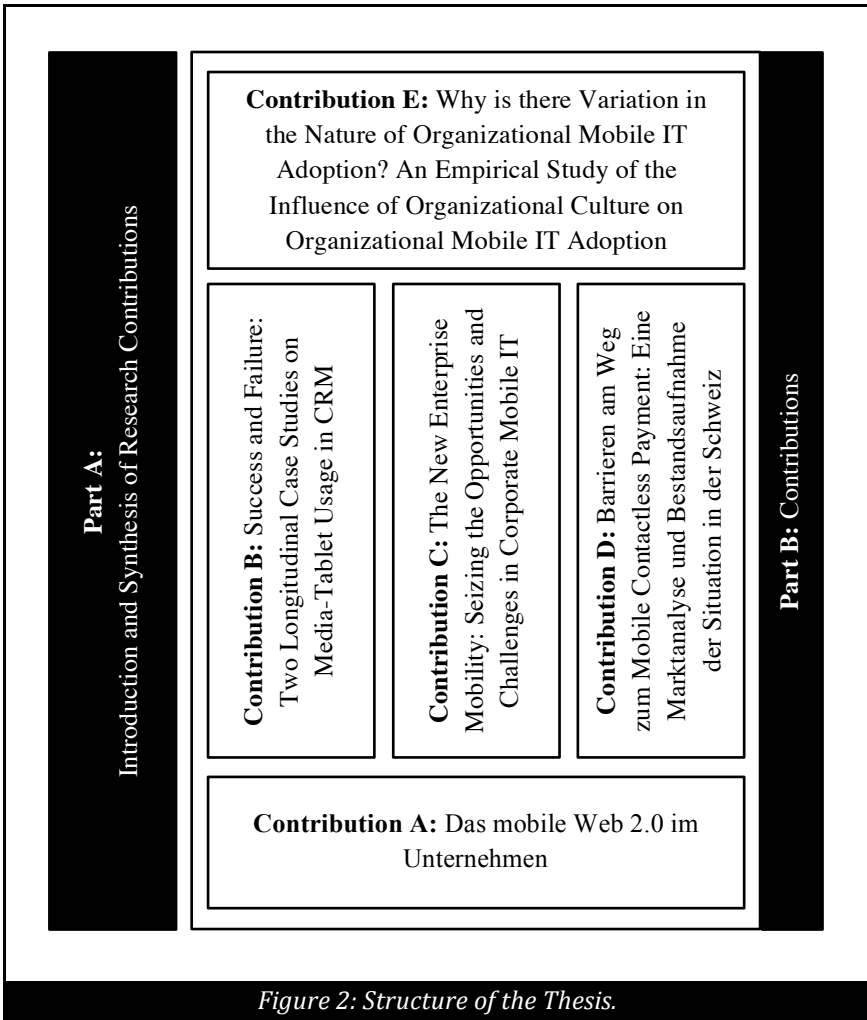


Figure 2: Structure of the Thesis.

2 Research Foundation

The following section offers a brief introduction to the research topic, and defines the scope of this thesis. As recommended (Randolph, 2009), it also summarizes vocabulary and the state of the topic based on a literature review. The research gap and research question are also defined further.

2.1 Research Streams and Important Terms

Information systems research (ISR) originated in the days of mainframe computers. At that time, information systems were designed for computer systems in which one computer (i.e., a mainframe) served many users (1:n). In the 1990s, this changed with the dawn of the PC, where one computer served one person (1:1). Some years later, the first mobile devices appeared and also the Web gained a broad audience and became more sophisticated in terms of usability and capabilities of Web applications. In the following years, computer hardware made advancements in terms of miniaturization, increasing processing power, storage capacity and battery lifetimes, as well as portability (Y. Yoo, 2010). These advancements accelerated expectations for the post-desktop computing era. First formulated in the article “Computer for the 21st Century” (M Weiser, 1991), Mark Weiser, a researcher at the Palo Alto Research Center (PARC), envisioned ubiquitous computing as a post-desktop computing era, in which users will own and be served by more than one computer (n:1). He proposed computer devices the size of tabs (like smartphones), pads (like media tablets), and boards (interactive whiteboards) participating in a ubiquitous network. Complying with this vision, the relationship between users and computers further changed and since the late 2000s we face the presence of ubiquitous computing and ubiquitous digital connectivity in most countries of the developed world.

Ubiquitous digital connectivity can be seen as the indispensability of the Internet for “digital natives” and the rapid uptake of smartphones, media tablets, laptop computers and other computer devices (Vodanovich et al., 2010). For ISR, the development has strong implications and is mentioned in a recent research

commentary in the leading ISR journal *Information Systems Research* (Vodanovich et al., 2010). According to Vodanovich et al., one of the major research questions in the near future for ISR is how traditional information systems need to transform to support and enable ubiquitous information systems, and serve emerging needs of users.

Lyytinen and Yoo (2002) drew comparable conclusions when they mentioned that the mobile IT phenomenon holds a unique set of challenges that should be of particular interest to ISR (Ladd et al., 2010). They identified three aspects, namely (1) mobility, (2) convergence and (3) mass scale, that give mobile IT the ability to form new combinations of infrastructure and services that lead to remarkable, new research fields for ISR scholars.

However, like most emerging topics, this phenomenon is hard to define and different research streams postulate different understandings. Thereby, several terms and definitions, which are associated with mobile IT and change towards ubiquitous computing, have been established. The most important are discussed and defined here.

2.1.1 Mobility, Mobile, and Wireless

In English, Mobility is a general term that refers to “the ability and willingness to move or change” (Sørensen, 2011). In an IT context, mobility is more specific, describing requirements for portability of a computer device to support or perform certain tasks. The term “mobile” is an extension of the term mobility, referring largely to the application or use of computer devices that support portability and connectivity (e.g., Internet access). Connectivity for portable computer devices is (mostly) implemented through wireless technology. In an academic context, “wireless” refers more to technical implementation and “mobile” to the application of portable computer devices with connectivity. Mobile is therefore characterized by a combination of computer portability and connectivity (Sørensen, 2011).

2.1.2 Mobile Computing and Mobile IT

“Mobile computing” is a signifier for the mobility of computer devices or as a categorization, separating computers with high portability from those with limited portability. It refers to the client part of a computer being portable and therefore implicitly supports users who are geographically mobile (Sørensen, 2011). Mobile IT supports computing on the move, using portable devices through wireless networks (Malladi & Agrawal, 2002; Hong Sheng et al., 2005; Varshney & Vetter, 2000). Mobile IT includes wireless infrastructure for connectivity, and mobile information appliances such as mobile phones, PDAs, and laptop computers (F. Nah, K. Siau, & H. Sheng, 2005; Hong Sheng et al., 2005; Varshney & Vetter, 2000).

2.1.3 Pervasive Computing, Contextual Intelligence, and Ubiquitous Computing

Pervasiveness means computer devices are spread throughout the environment. People are always surrounded by computers, for example, by carrying them as in the case of smartphones. Some authors add to this notion the capability of a computer to relate to its environment such as context-aware applications, automated capture, and sensitive and responsive computer environments (Sørensen, 2011). In this thesis, we do not include this addition to the term since we describe it separately as contextual intelligence.

Other authors refer to pervasive computing also as a synonym for ubiquitous computing (Hansmann, Merk, Nicklous, & Stober, 2003). However, we follow the original notion of Mark Weiser (1991), in which ubiquity describes in addition to (1) pervasiveness the (2) disappearance of the distraction created by PC era computers. Marc Weiser formulated this as follows: “Ubiquitous computing is the method of enhancing computer use by making (1) many computers available throughout the physical environment, but making them effectively (2) invisible to the user. [...] the computer today is isolated and isolating from the overall situation, and fails to get out of the way of the work. In other words, rather than being a tool through which we work, and so which disappears from our awareness, the computer too often remains the focus of

attention. And this is true throughout the domain of personal computing as currently implemented and discussed for the future, whether one thinks of PC's, palmtops, or dynabooks. The characterization of the future computer as the 'intimate computer' [...], or 'rather like a human assistant' [...] makes this attention to the machine itself particularly apparent" (Mark Weiser, 1993a). He concludes that computers in the era of ubiquitous computing will "weave themselves into the fabric of everyday life until they are indistinguishable from it" (M Weiser, 1991). Therefore, ubiquitous computing is an extension of pervasiveness by adding the factor of reducing the distraction created by computer devices. Although pervasiveness refers only to the technical presence of computer devices in the environment, ubiquitous computing adds a social factor as highlighted by this definition: "Ubiquitous computing is a socio-technical phenomenon in which computers are integrated into people's lives and the physical world and by that are ubiquitous" (Kalle Lyytinen & Y. Yoo, 2002). It signals the disappearance of the computer as an entity and describes the emergence of the post-PC era (Mark Weiser, 1993b).

2.1.4 Nomadic Computing, Enterprise Mobility, and Mobile Business

"Nomadic computing" focuses on the user and his/her working environment, rather than technology. Nomadic computing is enabled by a nomadic information environment consisting of interconnected technological and organizational elements. It enables the physical and social mobility of computing and communication services (Kalle Lyytinen & Y. Yoo, 2002).

An extension of this view is "enterprise mobility," which represents the study of mobile IT in the context of work (Sørensen, 2011). It encompasses adoption of mobile IT, including software and hardware, to support work at individual and organizational levels. Another extension is "mobile business," which encompasses all aspects necessary to create business value with the application of mobile IT.

2.1.5 mCommerce and uCommerce

Besides general use of mobile IT to support work, there are also terms that define use of mobile IT for special business tasks. One example is mobile commerce (m-commerce or mCommerce), which is a subset of eCommerce (Coursaris & Hassanein, 2002; Kwon & Sadeh, 2004), referring to any transaction with monetary value that is conducted via mobile networks (Clarke, 2001; NGAI & Gunasekaran, 2007). mCommerce adds portability to eCommerce (Junglas & R. Watson, 2003).

An extension of mCommerce is “uCommerce,” which is “use of ubiquitous networks to support personalized and uninterrupted communications and transactions between a firm and its various stakeholders to provide a level of value over, above, and beyond traditional commerce” (Junglas & R. Watson, 2003; R. T. Watson, Pitt, Berthon, & Zinkhan, 2002). uCommerce extends mCommerce to include four constructs: ubiquity, uniqueness, universality, and unison (Junglas & R. Watson, 2003). The literature refers to these as u-constructs (Junglas & Richard T. Watson, 2006).

2.2 Literature Review

As the definitions of these terms suggest, mobile IT is a wide and scattered research field. To gain an understanding of the research directions, theory, and methodology, a literature review on mobile IT-related research in ISR top journals⁴ was conducted. Since numerous articles exist in varying quality (Ladd et al. (2010) reviews 806 articles related to mobile computing), the search was limited to top journals to receive a workable number of articles for the reviewing process.

In the course of the literature search, the archives of the journals in question have been searched using the following keywords: *mobile*; *pervasive*;

⁴ The senior scholar’s basket of journals as defined by the Associaten for Information Systems in December 2011 (<http://goo.gl/BgA6k>) has been used: European Journal of Information Systems, Information Systems Journal, Information Systems Research, Journal of AIS, Journal of Information Technology, Journal of MIS, Journal of Strategic Information Systems, MIS Quarterly.

ubiquitous; *wireless*; *mobility*; *distributed network*; *Information Environment*.

The literature search was conducted in February 2012 and gathered 75 articles. After reviewing abstracts for topic relevance, the sample was reduced to 50 articles. The sample was then reviewed for qualitative and quantitative aspects. Table 1 gives an overview of the scope and research orientation of the articles, and the units of analysis.

Most articles use a qualitative exploratory research approach, and the focus is largely on theory and user behavior at the individual level. Concerning technology, most articles target *services* enabled by mobile IT. Research at the inter-organizational level primarily targets network providers, music content platforms, or the entire “mobile ecosystem”. Basole (2009) offers an overview on the growing network of companies interacting, directly and indirectly, to provide a broad array of mobile products and services to customers. At the organizational level, most articles focus on value creation and competitive advantages of mobile IT.

Orientation	Combined (1)	Qualitative (36)		Quantitative (13)		
	Nature	Descriptive (6)	Explanatory (11)	Exploratory (30)	Interpretive (3)	
Research focus	Legal issues & policy (2)	Strategy (8)	Theory (17)	User behavior (15)	Other (8)	
Layer of digital technology	Content (1)	Device layer (2)	Service (37)		None (10)	
Level	Individual level (25)	Inter-organizational level (4)	Organizational level (9)	Team / group level (3)	None (9)	

*Table 1: Research orientation and scope of top journal publications on mobile IT.*⁵

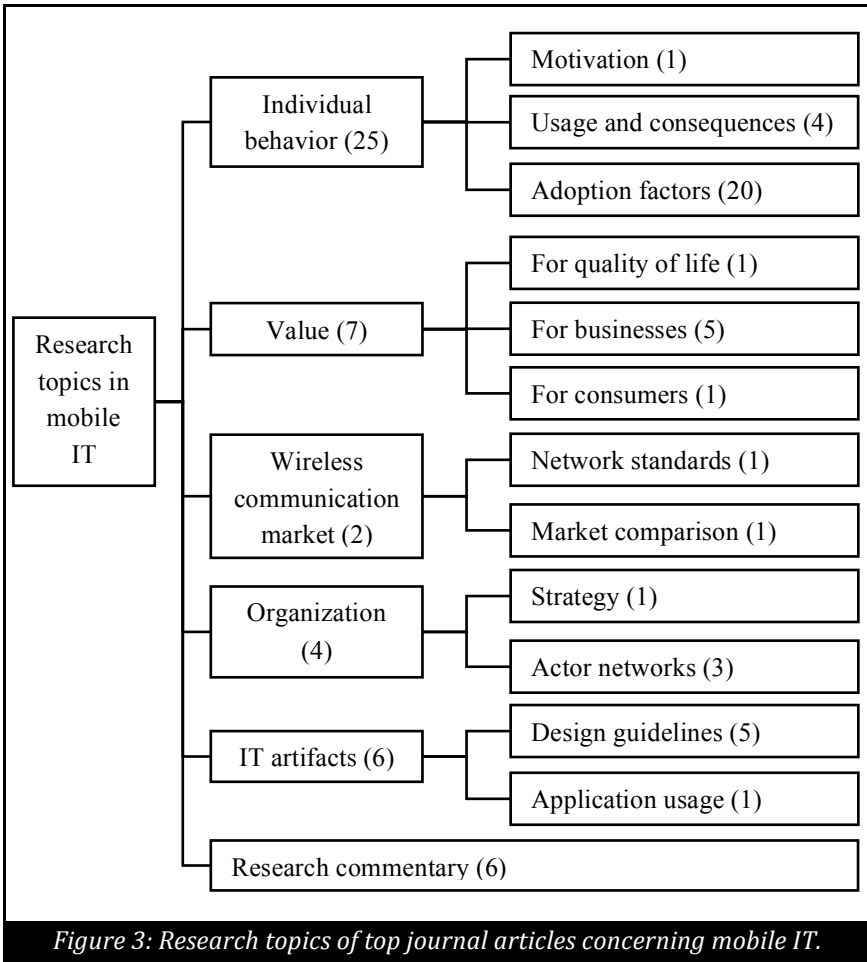
The reviewer⁶ tagged the 50 articles regarding domain, which created a categorization of topics. The categorization covers six categories, with twelve subcategories. In this way, every article can be assigned a category covering its topic. Figure 3 displays a categorization according to the topics of the articles.

The most frequent topic is adoption at the individual level, and individual behaviors. The literature review confirms that business value attracted the attention of several researchers. Another apparent aspect is that the category of research commentaries, mostly proposing research agendas on the topic of mobile IT, includes the second largest number of articles, which highlights the evolving character of this topic. This first literature review suggests that organizational adoption of mobile IT is under-researched, displaying only five articles that target mobile IT in organizations, in general.

⁵ Values in bracket relate to frequencies in relation to the sample.

⁶ The author of the thesis, Thomas Sammer.

For a deeper analysis, we refer to an article from Ladd et al. (2010), which provides a rigorous overview of the current state of the literature. They conduct a literature review on a related term of mobile computing (also covering any aspects of mobile IT), and analyze mobile computing trends in research and practice between 2000 and 2009, with an inductive categorization of 806 articles in nineteen leading academic, crossover, and practitioner outlets (Ladd et al., 2010). Results indicate that mobile technology is the most commonly addressed topic, but also the business perspective covering mobile applications/services and economics, strategy, business models, and technology acceptance is commonly addressed. Their results confirm our findings, suggesting that **(1) adoption at the organizational level is under-researched**, and the literature review demonstrates there is **(2) no common definition of mobile consumer IT or (3) research targeting this phenomenon**.



2.3 Second Generation Enterprise Mobility⁷

There are several definitions concerning mobile IT and its use in corporations. However, none of these definitions describes the unique features mobile

⁷ To define SGEM, text passages from contribution C, which includes the original definition of SGEM, have been used in this section.

consumer IT possesses. Based on the explorative research conducted in contribution C, the phenomenon, which creates opportunities and challenges for corporations related to mobile IT, is defined as Second Generation Enterprise Mobility (SGEM). The term relates to enterprise mobility since not only the device but also the software appears in this domain. In this sense, **the term enterprise mobility includes both software and hardware.**

The definition of SGEM is based on three characteristics, derived from the theory of ubiquitous computing (Lyytinen and Yoo 2002; Weiser 1991, 1999) and various descriptions collected in the explorative studies included in contribution C. Components of ubiquitous computing include superior usability and intuitive human-computer interaction, which cause the disappearance of the distraction created by conventional computer devices. This is evident with SGEM since the intuitiveness related to such devices increased to a level at which even people who are generally uncomfortable with computers are able to interact with media tablets without prior training. If we compare this kind of usability and intuitive use with PDAs or tablet computers from the early 2000s, the distinction is clear (Pitt et al. 2011). Increased usability also enables better integration into the context, providing computer support in situations where computers were previously perceived as distracting and inappropriate (e.g., during a sales talk or counseling interview). In terms of the definition of SGEM, this is intuitive computing.

A second characteristic is the market penetration of such devices. These new devices are a market success—especially in comparison to predecessors—and have reached such a high diffusion rate that they are available to nearly anyone. In addition to market penetration, the portability of the devices has also increased and led to a situation where SGEM is with people anywhere and anytime (Harris et al. 2012). These developments led to a new dimension of connectivity (Dery and MacCormick 2012) called pervasiveness.

Another distinction is evident in terms of the functionality of hardware (Jonsson et al. 2010; Pitt et al. 2010). SGEM devices possess a range of sensors that enable contextual intelligence.

By comparing these characteristics with devices corporations recognize as the driving force of mobile consumer IT innovation (Harris et al. 2012), namely novel smartphones such as the iPhone or Android devices, and media tablets such as the iPad or Android tablets, these devices conform well to the characteristics of ubiquitous computing:

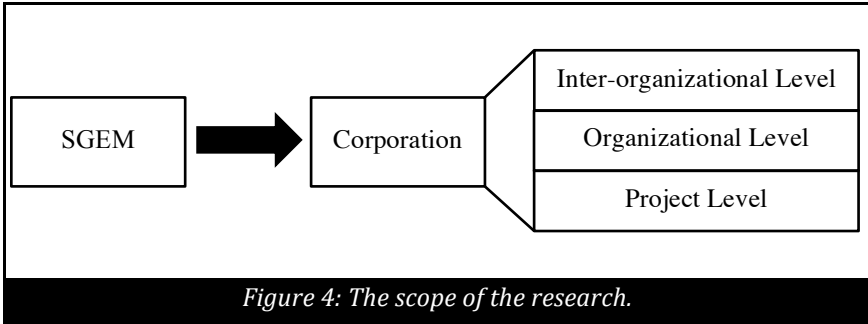
1. Intuitive computing: Mobile IT devices support an intuitive and accessible computing experience. These devices can be integrated seamlessly into a conversation and enhance it rather than detract from it.
2. Pervasiveness: Mobile IT devices are highly portable, allow continuous connectivity—and thus constant data and application consistency—and are available to nearly anyone, anywhere and anytime. This not only leads to better reachability of existing customers, but also to the possibility of reaching new customers (e.g., those in emerging markets).
3. Contextual intelligence: Mobile IT devices interact with and react to the environment due to sensory input such as location, acceleration, light conditions, user identification, etc.

The combination of these three characteristics defines SGEM.

2.4 Scope of the Research

The definition of SGEM sets the scope of this study since it defines the phenomenon more accurately than the term “mobile consumer IT”. Hence, this thesis focuses on SGEM, which includes hardware and software. As the term intimates, the study additionally focuses on business contexts, including the several stakeholders that SGEM affects.

As factors influencing adoption in organizations vary between small and large organizations, the focus of this thesis is limited to implications of SGEM in large corporations. However, to gain a complete understanding of how SGEM affects corporations, the phenomenon is explored on three levels of observation: project, organizational, and inter-organizational levels. Figure 4 summarizes and illustrates the scope of the thesis.



2.5 Research Gap and Research Questions

Based on the literature review, it can be concluded that research in particular on the influence of SGEM on corporations is still missing. Therefore, the first set of research questions targeted by contributions B, C, and D is intended to extend the existing knowledge of this phenomenon and to identify important factors in the adoption process of SGEM. Based on the results of the first set of research questions, the second set had been derived. The results concerning the first set of research questions implicated that organizational culture is an important factor in the adoption of SGEM. Organizational culture in particular is therefore targeted in the second set and contribution E respectively.

Table 2 gives an overview of the various contributions and targeted research questions. Contribution A is excluded from this table since the purpose of it was to identify a common definition of important terms, which did not follow a distinct research question.

Contribution		Research Question
Set One	Contribution B: Success and Failure: Two Longitudinal Case Studies on Media-Tablet Usage in CRM Observation: Project Level	What factors contribute to a successful adoption of media-tablets for professional business usage?
	Contribution C: The New Enterprise Mobility: Seizing the Opportunities and Challenges in Corporate Mobile IT Observation: Organizational Level	What opportunities and challenges do IT departments in corporations experience with SGEM?
	Contribution D: Obstacles to the implementation of mobile contactless payment: a market analysis and survey on the situation in Switzerland ⁸ Observation: Inter-Organizational Level	Which Obstacles prevent the Implementation of Mobile Contactless Payment in Switzerland? ⁸
Set Two	Contribution E: Why is there Variation in the Nature of Organizational Mobile IT Adoption? An Empirical Study of the Influence of Organizational Culture on Organizational Mobile IT Adoption Observation: The Influence of Organizational Culture	How does organizational culture influence the organizational adoption of mobile IT?

Table 2: Overview on Research Questions.

Figure 5 illustrates how these two sets fit. Results from set one provide general insights regarding the influence of SGEM on corporations at various levels of observation. Set two gives precise insights and explains the influence of organizational culture on adoption. Due to the development process of this thesis, the definition of SGEM evolved in parallel with its writing, which is the reason most of the contributions use the term mobile IT. Although some contributions use the term mobile IT to define the topic, the definitions created for the term mobile IT in the papers meet the requirements of SGEM.

⁸ Translated from German.

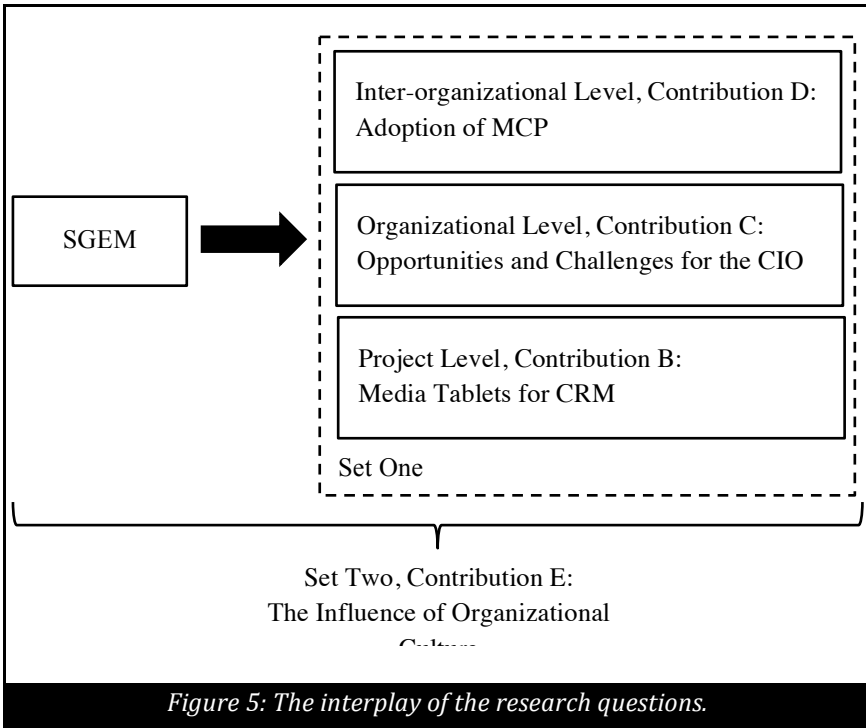


Figure 5: The interplay of the research questions.

2.6 Contribution and Audience

Although computers are common in most organizations, technological changes remain a transformative force in reshaping value creation at the project, organizational, and inter-organizational levels. Understanding organizational adoption of mobile consumer IT contributes to dealing with upcoming challenges concerning organizational adoption in the post-personal computer (PC) era. This thesis provides both deeper understanding of these influencing factors and recommendations for practitioners. This thesis addresses practitioners, scholars, and information systems researchers.⁹

⁹ Sections 5.1 and 5.2 discuss the implications of the research results.

Concerning the contribution for practitioners, the outcomes of this thesis help organizations understand challenges and opportunities regarding adoption of mobile consumer IT, and they explain the influence of organizational culture on this process. This is especially important since the influence of organizational culture can lead to biased decisions that hinder organizations from using the full potential of mobile IT.

Concerning the academic contribution, this thesis extends extant knowledge by exploring an under-researched topic, the adoption of mobile consumer IT in organizations; it extends existing understanding of the influence of organizational culture in this process.

3 Research Framework

This thesis consists of five contributions (A, B, C, D, and E). The research design for each contribution was selected according to its characteristics and demands. Generally, the thesis follows a positivist epistemological paradigm and tests hypotheses through empirical evidence (contribution E). A positivist view assumes reality is objective and can be described by measurable properties that are independent of the observer and the measurement instruments. Contribution E tests a theory based on results from contributions B, C, and D to increase the predictive understanding of the phenomenon (M. D. Myers, 1997).

Depending on the research objective of the contribution, data sets of disparate natures were used, including quantitative and qualitative varieties (Flyvbjerg, 2006). Qualitative data supports understanding what individuals experience and how they interpret experiences (Bluhm, Harman, T. W. Lee, & Mitchell, 2010). Quantitative data contributes to generalizability, and allows greater amounts of data points and understanding of the “how”. The research approaches of each contribution are described and summarized below.

3.1 Contribution A

Contribution A lays out common understanding of important terms and technologies related to mobile IT. Its purpose is to synthesize topics discussed primarily in practitioner-oriented outlets. The contribution is not a typical research paper that follows a stringent research design, but is a first step toward the topic and its practical relevance. Different from the other contributions, which were published in academic outlets, contribution A is a chapter of a textbook written for practitioners and management students. It therefore does not follow a particular research question. Contribution A is an outlier in terms of its research approach; it offers a simple introduction to the topic, which is why it was included in this thesis. Concerning the research approach, the contribution relies on desk research and secondary data.

3.2 Contribution B

Contribution B explores factors that contribute to adoption of media tablets, as a representative of SGEM, in CRM. It is based on case study research and uses both quantitative and qualitative data. Two perspectives are researched: management and users. Each of the perspectives demanded different data sets of disparate natures. To assess the management perspective, semi-structured interviews were conducted, and for the user perspective, a survey based on quantitative questionnaires was employed.

Qualitative data were analyzed using content analysis, and the quantitative data by employing descriptive statistics. This approach leads to a holistic view, but also intense data collection. Therefore, a precisely selected sample was needed. Hence, it is important to select an appropriate research strategy that was capable of handling small data samples.

In general, four research strategies can handle qualitative datasets with limited sample size: action research, case study research, ethnography, and grounded theory (M. D. Myers, 1997). Case study research is an “empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident” (Yin, 2003). These circumstances apply since a phenomenon was researched that is suited to an organizational context, but associated primarily with individuals acting within this context. A distinction between organizational and individual choice and perception cannot be made clearly. Therefore, we concluded that case study research with careful selection of significant cases meets the requirements best. Figure 6 illustrates the research design used in contribution B.

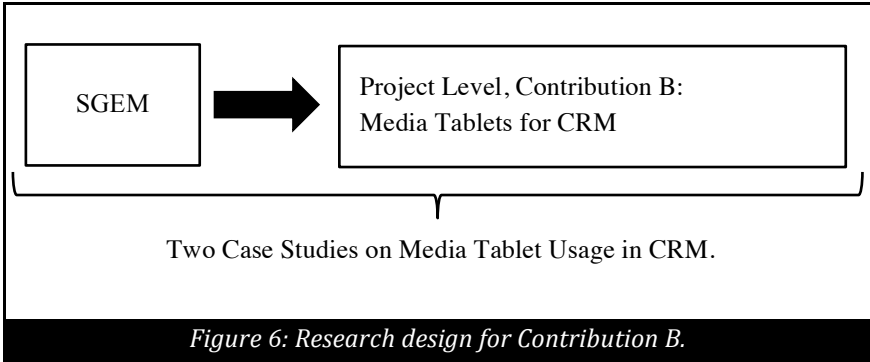
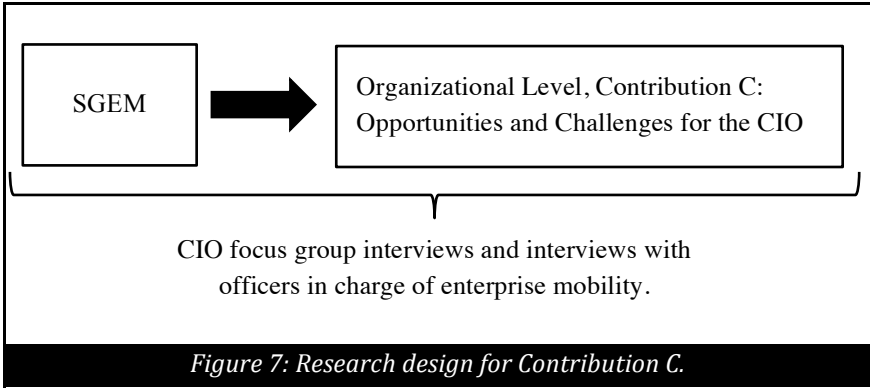


Figure 6: Research design for Contribution B.

3.3 Contribution C

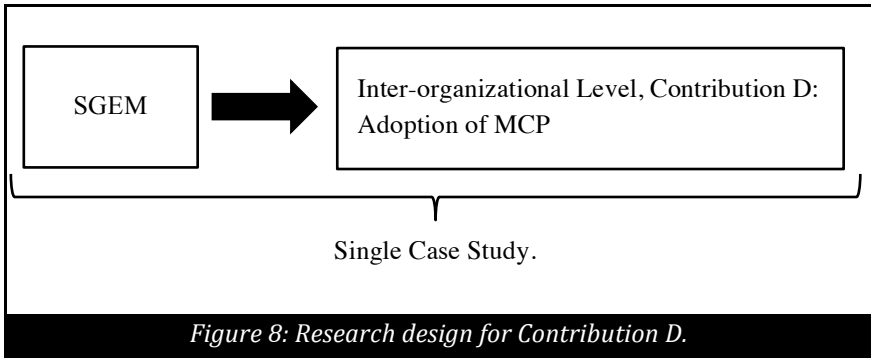
Contribution C explores how SGEM influences corporations at the organizational level. Actors who are at the forefront of this change are CIOs in corporations. We argue that CIOs experience this shift in expectations and its outcome within their work. Other actors that experience this shift are officers in charge of enterprise mobility. To assess the research question, data gathered in CIO focus group interviews and interviews with officers in charge of enterprise mobility were used. The research approach falls into the category of opinion research. The objective of opinion research is to gather data on attitudes, opinions, impressions, and beliefs of human subjects by collecting data through interviews or questionnaires (Jenkins, 1985).

Qualitative interviews are a preferred method of gaining deeper understanding of the perceptions and beliefs of a person; they give the unit of analysis a “voice”. Such insights support in-depth understanding of the expectations and experiences of the interviewees. For analysis, qualitative data analysis (QDA) and content analysis were employed to identify the major challenges and opportunities corporations experience regarding SGEM. QDA followed the approach recommended by Miles and Huberman (Miles & Huberman, 1994). Figure 7 illustrates the research design used for contribution C.



3.4 Contribution D

To assess how SGEM influences corporations on an inter-organizational scale, the challenges Swiss corporations face with implementation of mobile contactless payment (MCP) were researched. MCP associates strongly with SGEM and the characteristics that describe SGEM. Since MCP is not implemented in Switzerland and has seen several unsuccessful trials, this study focused on identifying barriers to MCP implementation. A single case study of MCP adoption in Switzerland was conducted. To identify drivers and barriers, qualitative interviews were conducted with officers in charge of mobile strategy in corporations necessary for implementation of an MCP system. Content analysis was used to assess data. Figure 8 illustrates the research design used in contribution D.



3.5 Contribution E

Based on results from contributions B, C, and D, hypotheses related to the influence of organizational culture on SGEM adoption were formulated. Culture, which originates in anthropology and sociology, has been applied to organizational studies since the early 1980s (Onwuchekwa, 2012). Due to its origins in two disciplines, various theories and frameworks of organizational culture emerged in academic literature (Onwuchekwa, 2012). One of the most common and widely used organizational culture frameworks is from Edgar Schein (Schein, 1996). Based on this a common definition of culture is offered by Hofstede as “the programming of the mind which distinguishes the members of one human group from another” (Hofstede, 2004). Following these definitions, **culture is a construct that influences how a group or organization reacts and decides.**

In general, culture theory has been used to explain a wide range of social behaviors and outcomes in organizational settings, including firm effectiveness, performance, strategy, job attitudes, administrative practices, merger and acquisition outcomes, technology transfer, and conflict resolution strategies in product innovation settings (Leidner & Kayworth, 2006). Organizational culture is also used commonly to explain organizational failures. For example, research into the Columbia and Challenger disasters experienced by NASA suggest one factor leading to disasters is a culture that values conformity to rules,

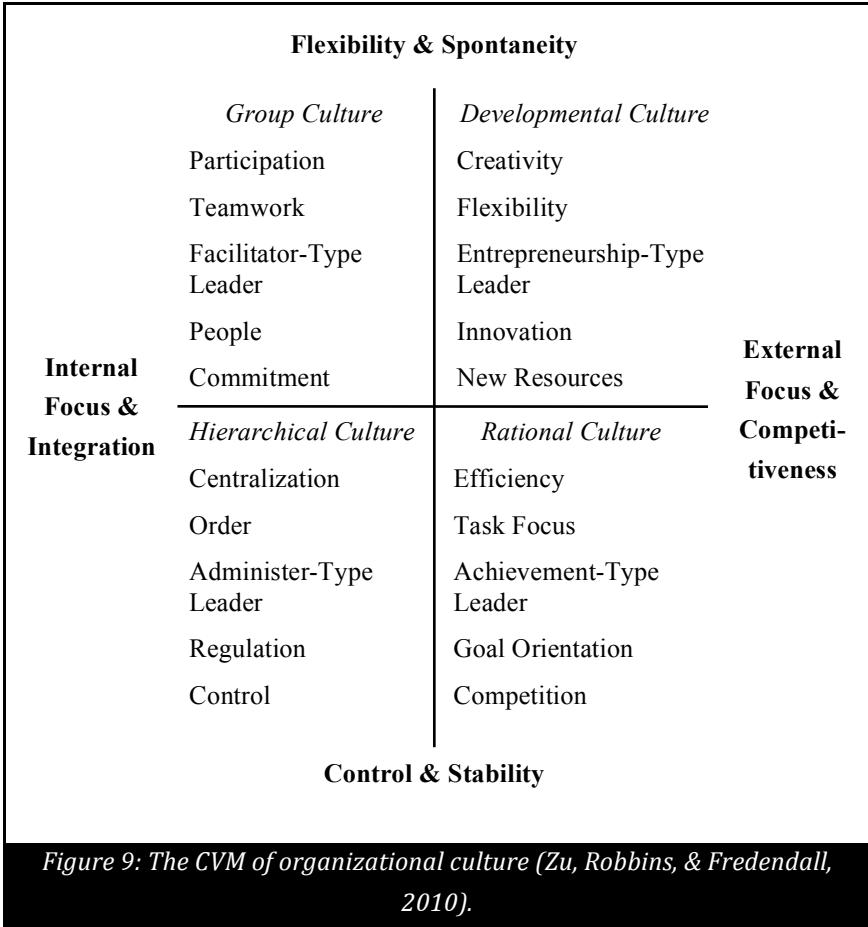
overlooking risks and over-reliance on simplified PowerPoint presentations of complex issues (Leidner & Kayworth, 2006; Tufte, 2003; Vaughan, 1996). Besides these famous cases, culture proves to be an influencing construct on various organizational issue in several other cases and contexts, and is also a construct used commonly to explain IT adoption (Leidner & Kayworth, 2006). Research suggests **organizational culture influences managers' choices of desired outcomes and decisions concerning means to achieve desired outcomes** (Yarbrough, Morgan, & Vorhies, 2011). Hence, it forms the context in which system development takes place. In reference to the interpretation of Schein (Schein, 1996), organizational culture is the “unconscious collective beliefs and assumptions that steer the values and through them the artifacts and actions of the organization, including the collective reactions as to whether a new approach or artifact is good or bad” (Iivari & Huisman, 2007). The theory suggests organizational culture influences perceptions of whether mobile IT is good or bad, and whether adoption of mobile IT is favorable. However, to use culture as a construct, disparate cultural types must be distinguished and operationalized as instruments.

Culture encompasses a wide range of aspects, and consequently, there is a wide array of instruments for culture (Jung et al., 2009). In a literature review of instruments for exploring organizational culture, Jung et al. identify 70 instruments and two basic distinctions: dimensional and typological (Jung et al., 2009). One key question that needs to be addressed is choice of instruments or approach, since they have varying foci and consider multiple aspects. To answer the research question concerning contribution E, an approach with predictive capabilities is needed. One approach for such research surveys is the *competing values model (CVM)*, introduced by Denison and Spreitzer (Denison & Spreitzer, 1991). The CVM is a value-based approach, which is a common approach to research culture in ISR and recommended by Leidner and Kayworth (Leidner & Kayworth, 2006). Additionally, CVM is a well-reported approach and uses short and validated measurements of organizational culture (Denison & Spreitzer, 1991; Iivari & Huisman, 2007). Another advantage of CVM is that it

can be also operationalized as a quantitative measure, which allows for higher numbers of observations than qualitative approaches.

CVM is a meta-theory that was developed to explain differences in values underlying several organizational effectiveness models (Denison & Spreitzer, 1991; Robert E Quinn & Rohrbaugh, 1981). Culture is measured in terms of values, separated by two distinctions: (1) change versus stability and (2) internal focus versus external focus (Denison & Spreitzer, 1991; Iivari & Huisman, 2007). Based on this distinction, Quinn and Kimberly extend CVM to “explore the deep structures of organizational culture, the basic assumptions that are made about such things as the means of compliance, motives, leadership, decision making, effectiveness, values, and organizational forms” (Denison & Spreitzer, 1991; R. Quinn & Kimberly, 1984). CVM therefore organizes patterns of shared values, assumptions, and interpretations that define organizational culture (Denison & Spreitzer, 1991).

Figure 9 illustrates the two dimensions on which CVM is based, and the four types of ideal cultural orientations that emerge from this distinction: group, developmental, rational, and hierarchical cultures (Buenger, Daft, Conlon, & Austin, 1996; Denison & Spreitzer, 1991; Iivari & Huisman, 2007; R E Quinn & McGrath, 1985; Robert E Quinn & Rohrbaugh, 1981, 1983; Zu, Robbins, & Fredendall, 2010).



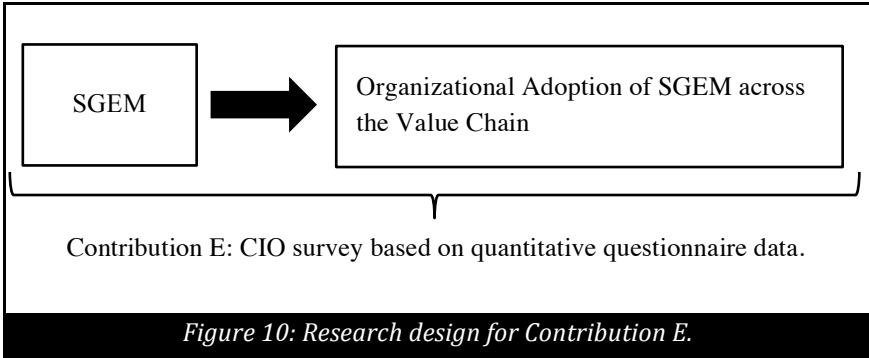
An important point is that an orientation on one axis is not exclusive, and orientations can even compete. Emphasizing one cultural orientation does not imply that another is deemphasized. Paradoxical combinations within organizations can be observed and are reported commonly (Yarbrough et al., 2011). Therefore, an organization’s culture can be hybrid, including characteristics of each of the competing cultural orientations to a greater or lesser extent (Yarbrough et al., 2011). It is also common that effective organizations exhibit some degree of balance among cultural orientations (Stock

& McDermott, 2001), and that overemphasis of one orientation may lead to a dysfunctional organization (Denison & Spreitzer, 1991; Stock & McDermott, 2001).

Concerning the research design of contribution E, CVM was used as the theory to formulate hypotheses. A common research approach to measuring organization culture is to assess items on quantitative questionnaires provided to senior executives. It is assumed that dominant actors determine organizational culture, so culture is most often assessed from the perceptions of senior management (Leidner & Kayworth, 2006). Comparable to contribution C, this contribution also followed an opinion research approach. In this case, data were collected through a quantitative questionnaire that employed Likert scale items. It created a quantitative data set, which was used to test hypotheses (Jenkins, 1985).

As the second necessary construct, SGEM adoption (called “Mobile IT adoption”, but referring to SGEM), is operationalized also with quantitative measures. Contribution E uses the measure provided by Tallon et al. (2000), since the instrument was validated and the items are generalized, so they can be applied easily to SGEM.¹⁰ By operationalizing these constructs on a quantitative questionnaire, it was possible to collect a larger sample and derive general conclusions. Partial least squares (PLS) was used to test the hypotheses in a structural equation model (SEM). Figure 10 illustrates the research design of contribution E.

¹⁰ For detailed information about the items and measurement approach, see Contribution E, Part B.



3.6 Overview on the Research Framework

Depending on the research question, various research strategies, datasets, and analysis methods were used. To summarize the research framework, Table 3 shows the approaches from each contribution.

Con-tribut.	Research Strategy	Dataset	Analysis
A	Synthesis	Desk Research.	Definition of terms.
B	Case Study Research (exploratory)	Qualitative interviews and quantitative questionnaire data.	Qualitative data analysis, content analysis, and descriptive statistics.
C	Opinion Research (exploratory)	Qualitative interviews and focus group discussions.	Qualitative data analysis, and content analysis.
D	Case Study Research (exploratory)	Qualitative interview data.	Qualitative data analysis, and content analysis.
E	Opinion Research (confirmatory)	Quantitative questionnaire data.	Structural equation modeling.

Table 3: Summary of research design.

4 Research Results

Research results can be differentiated by the nature of associated contribution. Contribution A offers common terminology. Contributions B, C, and D follow an exploratory approach and address set one of the research questions. Contribution E is confirmatory, representing set two, which builds on results from set one. Results from contribution A, sets one and two, are summarized below.

4.1 Contribution A

Contribution A is a first step toward understanding the latest advancements in mobile IT. It discusses basic terms, technologies, and products, and it suggests media tablets are a new category of devices. It further concludes that the innovation is not only happening on the hardware side, but also on the software side. Concerning software, novel devices such as smartphones and media tablets created new distribution channels for software applications, so-called App-Stores. However, not all technologies available to develop Apps (software applications) are capable of producing Apps that can be distributed through App-Stores. The article differentiates software technologies into three categories: Native App, Mobile Website, and Hybride App. The advantages and disadvantages of the technologies are discussed, and the article closes by presenting use-cases for Apps and discussing a future vision by Tim O'Reilly and John Battelle, the Web-Squared.

4.2 Set One, Contributions B, C, and D

Research questions in set one focus on varying levels of observation: project, organizational, and inter-organizational levels.

4.2.1 Contribution B

Contribution B, which targets the project level, is concerned with factors that contribute to adoption of media-tablets for professional business use.

Conclusions were derived from longitudinal case study data from two comparable cases. The first case turned out to be a success, and the second a failure, thereby turned down by management. Comparison of the cases showed that even simply porting an existing CRM solution to a media tablet creates benefits; the fact that an existing solution is available on a media tablet is sufficient to create benefits. Both cases suggest the new application offered advantages in comparison to predecessors. Concerning the reason one case was turned down and the other labeled a success, a pivotal factor is that in the successful case, the project was triggered top-down, and in the failure project, bottom-up. Additionally, qualitative data yields that in the successful case, management was very open to IT innovation and promoted use of new technologies. In comparison to that in the failure case, the project was launched as an innovation project, without a defined business case. When it came to the point when the project managers had to convince top management that the new application was beneficial, top management stopped the project.

By comparing the companies generally, company alpha (i.e., the successful case) is very open to innovation and market competition, indicating an externally oriented OC. It stated that it wants to be the market leader through innovation. In comparison, company beta is focused more on producing and developing a high-quality product, indicating an internally oriented OC. Its purpose is to succeed through incomparable high quality. These are disparate aims associated with the companies' organizational cultures. Results from this study offered an initial suggestion that organizational culture is an influencing factor in SGEM adoption.

4.2.2 Contribution C

Contribution C targets the organizational level. Its purpose is to understand better the challenges and opportunities that corporations face regarding SGEM. Additionally, the understanding of the phenomenon advanced sufficiently to define it more clearly, which lead to the introduction of the term SGEM. Therefore, contribution C introduces the term SGEM. Concerning opportunities and the challenges, the paper identifies three opportunities corporations are

experiencing with SGEM, namely sales, service, and internal efficiency. Additionally, four challenge areas are identified, namely usability versus security, innovation management, software development styles, and staffing. Concerning both, opportunities and challenges, the paper provides several industry examples. One conclusion of the paper is that corporations always experience challenges through SGEM regardless of whether they support SGEM. This is due to a type of spillover effect. Results suggest that executives perceive that the experiences employees and customers make concerning consumer IT represent a new baseline for corporate IT. Expectations thus are transferred into the corporate context. The paper includes several quotes from executives that highlight this spillover. Executives also mentioned that this is a challenge for the role of the IT department in general, which is responsible for ensuring efficient operations. However, due to SGEM, they now increasingly perceive they should support business units more dynamically and innovatively to facilitate projects and activities. These objectives are perceived as competing, and most IT departments focus on operations, not innovation. Given these two objectives, two mindsets converge. The paper concludes that the major challenge is changing the role of the IT department, which SGEM accelerates. The paper reports on an approach that one company followed to solve the problem.

Concerning the influence of organizational culture, the difference between operations- and innovation-focused supported the hypothesis that organizational culture is an important factor that influences SGEM adoption. Contribution C thus also yields implication for the important role of organizational culture in the adoption of SGEM.

4.2.3 Contribution D

Contribution D targets the inter-organizational level. Advancements in technology led to a situation where MCP implementation was possible, but was not in a mature state. To understand what hinders MCP implementation in Switzerland, contribution D conducted interviews with important stakeholders. Analysis of the interviews revealed that there is a misunderstanding among

stakeholders. The potential users of the technology (i.e., merchants and customers) are very open to MCP, and merchants even stated that they demand its implementation. However, providers (i.e., financial services, technology, and trusted service providers) stated there is no demand for a new payment system. The group of potential provider companies also stated it does not like to promote new technology since it could mean it would have to change or lose existing business models. Results demonstrate that for adoption of an SGEM application in an inter-organizational setting, the organizational cultures of the companies are important factors. Therefore, also contribution D yields implication for the important role of organizational culture in the adoption of SGEM.

4.3 Set Two, Contribution E

Contribution E connects implications of the papers from set one and formulates a set of hypotheses concerning the influence of organizational culture on SGEM adoption. The paper is based on the competing values model of organizational culture, which includes four types: group culture (GC), developmental culture (DC), hierarchical culture (HC), and rational culture (RC). Based on the theory of organizational culture and the implications derived from set one, the paper tests whether group culture and/or a developmental culture influences SGEM adoption in the primary activities of the value chain (supplier relations, production and operations, and customer relations). Six hypotheses are formulated, covering all combinations of group/developmental culture and the three primary activities of the value chain. Results suggest a positive relationship between developmental culture, which is an externally oriented culture, and SGEM adoption in customer relations. Results also show a positive relationship between group culture, which is an internally oriented culture, and SGEM adoption in production and operations. Hence, results suggest relationships between various types of organizational culture and SGEM adoption. Contribute E thus advances understanding of the nature of the influence, revealing that disparate types of organizational culture lead to unequal adoption of SGEM across the value chain.

5 Discussion and Closure

"Company cultures are like country cultures. Never try to change one.

Try, instead, to work with what you've got."

Peter F. Drucker¹¹

The previous section offers an overview of the results of contributions A through E. However, all contributions are included in part B, which includes the detailed results of the contributions. In this section, a synthesis of results is given and implications for theory and practice are discussed.

In general, this study suggests that independent of the level of observation (i.e., project, organization and intern-organizational), SGEM influences corporations. It shows that various types of organizational culture are important factors concerning how organizations react to SGEM. Results from contribution E show that depending on organizational culture, corporations adopt SGEM differently, but these results also have implications for results derived in previous contributions.

Contribution B researches an SGEM application associated with customer relations, a CRM application. The company in the successful case reported that it wants to be the market leader through innovation. This fits well with the definition of an externally oriented culture. The company in the unsuccessful case reported that it focuses more on its product quality and therefore on internal processes. This fits the definition of an internally oriented culture. In the successful case, a company that favors an external culture implemented an application in customer relations. In the second case, a company that favors an internal culture also implemented an application in customer relations. It appears that the second case shows a misfit between organizational culture and the application. Although the successful case follows the notion that an externally oriented culture adopts SGEM in customer relations, the unsuccessful case did not. Therefore, orientations in organizational culture may influence the success

¹¹ Retrieved from <http://www.qfinance.com/finance-and-business-quotes/corporate-culture>

of SGEM adoption in various areas of the value chain. Although results of contribution B and E support this implication, further research is necessary to confirm the relationship.

Contribution C suggests IT departments must balance ensuring operations and stability and supporting innovation and business needs. IT departments also need to balance at least two orientations of organizational culture, internal and external. An external orientation supports innovation and an internal orientation ensures stability and operations. This suggests that IT departments with a balanced organizational culture will meet the expectations created by SGEM better. However, this relationship was not tested. Future research should assess the relationship between IT department performance and organizational culture of the IT department.

Contribution D suggests organizational culture influences MCP implementation, but this implication is limited and requires further research.

In summary, this thesis demonstrates that varying types of organizational culture influence SGEM adoption. However, it is limited because the results do not cover performance measures and are incapable of giving final recommendations concerning which type of organizational culture is best for SGEM adoption. Future research should therefore follow up on this question. Nevertheless, the results of the thesis include several important theoretical contributions and managerial implications, which are discussed below.

5.1 Theoretical Contribution

The literature review suggests a lack of understanding concerning innovation in mobile IT that occurred in the last few years, starting with the introduction of novel smartphones. Extant literature focuses on devices and mobility factors, but focusing on these is inappropriate to cover the nature of innovation corporations face. This thesis introduces a definition, SGEM, which is suited to define and describe this innovation. It contributes new knowledge to the understanding of mobile IT and the changes that occurred with the appearance of the smartphone. A detailed description of SGEM is offered in contribution C.

Besides contributing to the theory of mobile IT, the thesis contributes to better understanding of the influences of organizational culture. Organizational culture is an extensive theory that covers several dimensions of culture. To date, only one dimension, flexibility- versus stability-focused types of organizational culture (Chen & Nath, 2008), is known to influence adoption of mobile IT in organizations. By targeting two types of organizational culture that can be distinguished by another—externally versus internally focused organizational cultures—the thesis extends extant theory by introducing the influence of another dimension.

This extension has implications for existing models such as the theoretical model of nomadic culture (Chen & Corritore, 2008). The model is based on several assumptions that are in turn based on the influence of the cultural dimension flexibility versus stability. Regarding results from contribution E, we propose that the cultural dimension internal versus external focus should be added to the model of nomadic culture.

Further, results extend knowledge not only by researching the untargeted cultural dimension of internal versus external focus, but also by extending understanding of the influence on parts of the value chain. Although previous research focuses on adoption in any part of the organization, contribution E examines the influence on parts of the value chain, offering precise understanding of the phenomenon and increasing the predictive capabilities of extant theory.

5.2 Managerial Implications

A detailed discussion of managerial implications for each contribution is given within the contributions, but by synthesizing research results, additional implications were revealed.

Contribution B concludes that top management support is an important factor for the success of SGEM projects, and organizational culture influences executive decisions (Leidner & Kayworth, 2006). The projects reviewed in contribution B represent externally oriented applications (i.e., customer

relations). In the successful case, cultural orientation (i.e., externally oriented) fit the field of application for the SGEM project. This was not true in the unsuccessful case. In unsuccessful case, the application was oriented externally, but the company had an internally oriented organizational culture. Results from contribution E support this observation; companies with an externally oriented organizational culture adopt SGEM in the external parts of their value chains (e.g., customer relations), and internally oriented companies in the internal parts. This suggests management decisions concerning SGEM application are influenced by organizational culture, and lead to unequal adoption across the value chain.

Based on the assumption that both types of companies can gain benefits from SGEM application in any part of the value chain, companies should advance adoption in any part. To prevent wasting benefits of SGEM due to biased decisions, we recommend that CIOs regularly evaluate SGEM adoption across the organization. If a lack of adoption is identified, executives should evaluate why adoption lags in this area.

To achieve the goal that SGEM adoption is supported in all parts of the value chain, it is not recommended to change organizational culture, but instead being aware of biased decisions that lead to unequal SGEM adoption. In accord with the opening quote by Peter Drucker (“Company cultures are like country cultures. Never try to change one. Try, instead, to work with what you've got.”), executives should be aware of biased decisions and that organizational culture can prevent a company from unlocking SGEM’s full potential. However, they should not try to change organizational culture, but instead understand the implications an orientation has on the technological development of a company.

5.3 Critical Reflection and Final Personal Opinion

"Culture is the organization's immune system."

Michael Watkins¹²

A major limitation of the research results is that they are not capable of making conclusions on performance aspects. The underlying assumption of the given managerial recommendations (5.2) is that organizational culture influences, in which areas of the value chain SGEM is adopted, but not if a certain cultural orientation is a supporting or adverse factor for gaining business benefits from the adoption of SGEM. There is no complete evidence that a successful usage of SGEM is related to a certain type of organizational culture. However, this does not mean that such a relation is inexistent, but that the research of this thesis did not cover this aspect.

As we assumed that a culturally biased decision about where to adopt SGEM has negative implications for the company as they miss the potential to gain business benefits through the usage of SGEM in some parts of the value chain, it can be also assumed that these culturally biased decisions are beneficial for the corporation. Michael Watkins proposed that organizational culture "is the organization's immune system". Based on this assumption, an unequal adoption of SGEM across the value chain could also prevent a company from making investments in improving a part of the organization that is not of importance for this certain organization. The assumption underlying the recommendations also includes that any part of the value chain is of equal importance to the company. However, if this is not the case, an unequal adoption of SGEM could be beneficial if the adoption rate of SGEM matches the level of importance of the certain area in the value chain.

In my opinion, these questions are the logical next step to these research results. While these results gave us a first insight into the influence of organizational culture on the adoption of SGEM, we are still at the beginning to understand this important topic. As IT is getting more and more involved in any part of the

¹² Retrieved from http://blogs.hbr.org/cs/2013/05/what_is_organizational_culture.html

organization as well as into our everyday life's, the importance of understanding associated "soft factors" increases through this development. For a successful organization it will be of highest importance to constantly gain new business advantages through the employment of SGEM and IT in general. Hence, it is important to know whether decisions that are influenced by organizational culture lead to beneficial or adverse implications. This question is important to all levels of observation, including the project, organization and inter-organizational level.

However, some authors also mention that organizations, which display a balance across the different dimensions of organizational culture, are more successful than organizations that are focused on one of the extremes (Leidner & Kayworth, 2006). Relating to our results, this assumption can be supported, as such organizations would tend to an equal adoption of SGEM across the value chain. But such a conclusion would lead to the recommendation that an organization should actively change its organizational culture to maintain a balanced situation. In any case, this is related with an intense effort in organizational change, which is why such a recommendation should not be given before performance measures indicate that a balanced culture is beneficial.

Nevertheless, concerning the challenge that IT departments within corporations face, namely to provide stability in IT operations but also IT innovation, I believe that a balanced culture would be an important target to achieve in IT departments. As an information systems scholar I sometimes get really upset by the aversion to innovation that I perceive when working together with IT departments. From my point of view, IT department will have to learn how to be more balanced between these extremes or to split apart into two different organizational units; one for operations and for innovation.

In general, I am convinced that for the upcoming years the focus of organizational IT issue will shift from technological aspects more towards cultural aspects. As people getting more and more used to technology, their expectations change and successful IT departments will have to meet these expectations with the right mindset and attitude.

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Part B

Contribution A: Das mobile Web 2.0 im Unternehmen

Title	Das mobile Web 2.0 im Unternehmen
Authors & Affiliation	Thomas Sammer, University of St.Gallen Thomas Walter, University of St.Gallen
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Table 4: Bibliographical Information for Contribution A.

1 Das mobile Web 2.0 im Unternehmen

Kaum eine andere Technologie hat den privaten und beruflichen Alltag in den letzten Jahren so verändert und geprägt wie die mobile Kommunikation. War der Funktionsumfang von mobilen Kommunikationsgeräten für Konsumenten anfänglich noch auf Sprach- und (kurze) Textkommunikation beschränkt, haben mittlerweile neue, leistungsfähigere Übertragungsstandards einen schnellen und vollumfänglichen mobilen Internetzugriff ermöglicht. Parallel zu dieser Entwicklung haben sich ebenfalls neue Endgeräte am Markt etabliert, die eine intuitive und platzsparende Bedienung mit grösseren Anzeigen kombinieren. So ermöglichen moderne Smartphones einen komfortablen, umfangreichen und ortsungebundenen Zugriff auf Webdienste und erweitern deren Funktionsumfang teilweise sogar durch neue Merkmale wie kontextbezogene Informationen oder Foto-, Video- und Tonaufnahme- und Wiedergabefunktion. Der Trend zum mobilen Internetzugriff hält stetig an und Experten prognostizieren, dass spätestens ab 2015 die Anzahl von mobilen

Internetnutzern jene von stationären bzw. Desktop-Internetnutzern überholt haben wird [vgl. Meeker et al. 2010]. Dieser Trend kann als nachhaltige Verlagerung angesehen werden und hat weitgreifende Konsequenzen für die zukünftige Internetnutzung, den Funktionsumfang und die Möglichkeiten von Webdiensten und damit auch allen Bereich des Web 2.0. Der folgende Beitrag definiert die wichtigsten Begriffe und Konzepte, zeigt Anwendungsfelder von mobilen Web-2.0-Anwendungen im Unternehmen, gibt eine Zusammenfassung zu den damit verbundenen Vorteilen und Herausforderungen und schliesst mit einem Ausblick auf zukünftige Entwicklungen.

2 Begriffe, Klassifikation und Funktionen

Im Zusammenhang mit dem mobilen Web 2.0 sind besonders die Anwendungen relevant und weniger die technische Umsetzung. Bevor aber über Anwendungsfälle nachgedacht wird, ist es dennoch sinnvoll eine Klassifizierung anhand von gerätebezogenen Eigenschaften durchzuführen, um ein Verständnis für mobile Endgeräte und die dadurch neu eröffneten Möglichkeiten zu erlangen.

2.1 Neue Geräteklassen: Smartphones und Media Tablets

Der Begriff Smartphone ist eine Bezeichnung aus dem Marketing, welcher jedoch mittlerweile in vielen Bereichen weitgehend übernommen wurde und eine Kombination aus Mobil-telefon, PDA (Personal Digital Assistant) und weiteren Geräten (bspw. Foto und Videokamera) darstellt. Der Begriff wird meist mit modernen Mobiltelefonen, die eine Multi-Touch-Eingabe erlauben (wie iPhones, Android- oder Windows Phone-Geräte), assoziiert. Generell fallen allerdings auch andere Geräte unter diese Bezeichnung wie Blackberry- oder Nokia Symbian-Smartphones. Wir folgen in diesem Beitrag der Definition von [Pitt et al. 2010] und definieren Smartphones wie folgt: Das Smartphone erweitert herkömmliche Mobiltelefone mindestens durch die folgenden vier Eigenschaften:

1. Multimediale Einsatzmöglichkeiten: Zur Wiedergabe besitzen Smartphones eine hoch-auflösende und brillante Anzeige in Kombination mit einer Tonwiedergabe per integrierten Lautsprechern oder Kopfhörern. Damit wird es dem Anwender möglich, Fotos und Videos in hoher Qualität jederzeit wiederzugeben bzw. über die integrierte leistungsstarke Datenverbindung kaufen und beziehen zu können. Als Aufnahmeggerät bieten Smartphones die Möglichkeit, über die integrierte Kamera und das Mikrofon Videos und Fotos aufzunehmen. Diese können dank des leistungsfähigen Prozessors direkt am Gerät bearbeitet und über die Datenverbindung an Webdienste weitergegeben werden.

2. Beschleunigungs- und Lagesensoren: Durch diese Sensoren kann das Gerät Bewegung und seine aktuelle Lage (wird es beispielsweise im Hochformat oder Querformat gehalten) erkennen und darauf entsprechend reagieren. Eingesetzt werden diese Informationen zur optimierten Darstellung oder Bedienung des Geräts.

3. Ortungsfähigkeit (GPS): Über das integrierte GPS-Modul werden eine sehr präzise Ortung und damit bspw. Navigationsanwendungen möglich. Technisch bereits umsetzbar, aber noch wenig verbreitet, ist die Indoor-Ortung für die Navigation in Gebäuden. Die Indoor-Ortung wird bspw. über die Triangulation von WLAN-Hotspots realisiert.

4. App-Economy bzw. App-Stores: App bezeichnet kleine Anwendungen bzw. Programme, die auf mobilen Endgeräten installiert bzw. ausgeführt werden können. Smartphones besitzen Anwendungen, über welche die Benutzer zentral Apps kaufen und beziehen können. Damit wurde ein neuer Distributionskanal geschaffen, über welchen die Benutzer je nach Bedarf Apps kostenfrei oder kostenpflichtig beziehen können. So können Drittanbieter ihre Software an eine breite Kundschaft vermarkten.

Neben diesen Eigenschaften besitzen Smartphones meist auch Zugriff auf personenbezogene Daten wie Terminkalender- und Kontaktinformationen.

Erlauben diese Eigenschaften bereits einzeln die Umsetzung von sehr neuartigen Anwendungen, ergibt die Kombination ein noch höheres Innovationspotential.

So können durch die Kombination aller genannten Eigenschaften bspw. Augmented Reality Apps oder Apps mit kontextbezogenen Informationen umgesetzt werden.

Generell sind Smartphones und Media Tablets von ihren Eigenschaften ausgehend sehr ähnlich, bilden aber dennoch jeweils eigenständige und sich voneinander unterscheidende Geräteklassen. Mit dem Begriff Media Tablet werden Tablet Computer wie das iPad bezeichnet, welche ebenfalls die vier oben genannten Eigenschaften aufweisen, die Steuerung per Multi-Touch-Eingabe erlauben und über eine entsprechend grosse Anzeige (ab 7 Zoll) verfügen. Dass Media Tablets nicht als Substitut, sondern eher als Ergänzung zu bestehenden Geräte-klassen betrachtet werden müssen, zeigt eine Studie von Gartner zum Computernutzungsverhalten von mit bzw. ohne Media Tablet ausgerüstetem Sales-Personal. Die Studie stellt fest, dass die Gesamtzeit an Computernutzung (Smartphone, Laptop und Media Tablet; vgl. dazu Abb. 11) steigt und die Arbeitszeit je Zugriff bei Laptops länger bzw. weniger oft unterbrochen und somit kontinuierlicher wird [vgl. Nelson und Willis 2011]. Die einzelne Nutzungszeit je Geräteklasse nimmt durch die zusätzliche Ausrüstung mit Media Tablets kaum ab. Die Ergebnisse zeigen somit, dass Media Tablets als eigenständige Gerätekategorie betrachtet werden müssen und offensichtlich für bestimmte Anwendungen von Benutzern bevorzugt werden. Gründe dafür werden in der schnellen Zugriffszeit („instant on“), dem angenehmen Formfaktor, der intuitiven und für die Zusammenarbeit bzw. das Erklären am Bildschirm gut geeigneten Eingabeart (Multi-Touch-Eingabe) gesehen. Besonders bei Anwendungen im Verkauf oder im Gespräch mit mehreren Personen wird über positive Effekte berichtet.

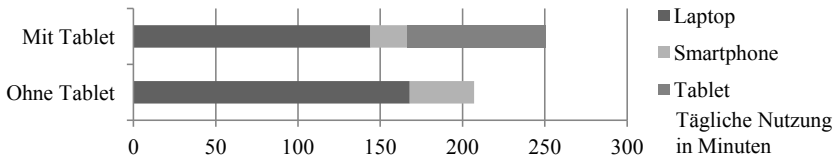


Abb. 11: Computernutzungsverhalten von Sales-Personal mit bzw. ohne Media Tablet in Stunden pro Arbeitstag [vgl. Nelson und Willis 2011]

2.2 Neue Kanäle: App-Stores

Ein mit modernen Smartphones und Media Tablets eng verbundener Begriff ist der App-Store. Der Begriff App-Store bezeichnet grundsätzlich den App-Distributionskanal von Apple, wird hier jedoch auch stellvertretend als Überbegriff für App-Distributionskanäle weiterer Hersteller bzw. Betriebssysteme verwendet. App-Stores sind Anwendungen, die einen zentralen Distributionskanal für Apps auf Smartphones und Media Tablets darstellen. Neben der Distributionsfunktion sind App-Stores aber auch ein Marktplatz, der es auf der einen Seite Anwendern erlaubt, Apps zu kaufen bzw. zu beziehen, und auf der anderen Seite für Entwickler eine Möglichkeit ist, ihre Apps kostenfrei oder kostenpflichtig anzubieten. Von jedem über einen App-Store betätigten Kauf profitieren sowohl der Entwickler als auch der Betreiber des Marktplatzes in Form einer Provision (meist zwischen 30 und 20 %). Abb. 12 gibt einen Überblick zu den wichtigsten App-Stores, deren Betreibern und der Anzahl an angebotenen Apps. Neben diesen öffentlichen App-Stores ist es Unternehmen auch möglich, eigene unternehmensinterne App-Stores zu betreiben. Diese App-Stores werden als Enterprise App-Store bezeichnet und ermöglichen das Verteilen von Apps, die bspw. über eine Unternehmenslizenz gekauft wurden, an die Mitarbeitenden eines Unternehmens.






Markt	App Store	Android Market	App World	Nokia Store / Ovi	App Catalog	Marketplace
Betreiber	Apple	Google	RIM	Nokia	Palm / HP	Microsoft
Logo						
Betriebs-systeme	iOS		BlackBerry	symbian OS	webOS	Windows Phone
Hardware	iPhone, iPad, iPod Touch	hTC, Motorola, Samsung, LG und weitere	BlackBerry	Nokia, Sony Ericsson und weitere	HP, Palm	Nokia, Samsung, hTC und weitere
Go live	07/ 2008	10/ 2008	04/ 2009	05/ 2009	06/ 2009	10/ 2010
Angebot (Anzahl Apps)	512,749 ('10/2011)	352,800 ('10/2011)	43,000 ('11/2011)	104,576 ('9/2011)	7,062 ('6/2011)	40,000 ('11/2011)

Abb. 12: Übersicht zu App-Stores.

Hinweis: Daten entnommen im Dezember 2011 von Wikipedia (http://en.wikipedia.org/wiki/List_of_digital_distribution_platforms_for_mobile_devices).

2.3 Eine neue Anwendungsklasse: Apps

Apps sind ein zentraler Bestandteil von modernen mobilen Endgeräten. Abgesehen von Standardanwendungen wie E-Mail, Kalender oder Adressbuch beziehen sich Lösungen für mobile Anwendungen meist auf Apps. Eine allgemeingültige thematische Klassifizierung von Apps vorzunehmen, ist allerdings nur schwer möglich. Apps gibt es für verschiedenste Bereiche, und sie lassen sich teilweise nur schwer einer Kategorie zuordnen. Im Gegensatz zur thematischen Klassifizierung lassen sich Apps jedoch recht eindeutig nach ihrer technischen Umsetzung unterteilen. So sind zumindest drei Typen von Apps bzw. Umsetzungsvarianten von Apps zu beachten: Native Apps, Mobile Webseiten bzw. HTML5-Apps und hybride Apps.

2.3.1 Native Apps

Native Apps sind Apps, die speziell für ein Betriebssystem entwickelt werden und über eine zentrale Distributionsanwendung (App-Stores) zum Verkauf und zur Installation angeboten werden. Alle für das jeweilige System verfügbaren Apps stehen über diese zentrale Plattform zur Auswahl und können den Präferenzen und Ansprüchen des Anwenders entsprechend installiert werden. Native Apps sind meist nur auf einem Betriebssystem lauffähig. Möchte ein Entwickler also eine App für Apple- und Android-Geräte anbieten, muss die App zwei Mal programmiert werden.

2.3.2 Mobile Webseiten

Mobile Webseiten sind Webseiten, die sowohl für die Bildschirmauflösung als auch Daten-eingabe und Bedienung auf mobilen Geräten angepasst sind. Wurden mobile Webseiten anfänglich nur dazu eingesetzt, bestehende Internet-Angebote optimiert für mobile Geräte anzuzeigen, werden dank HTML5, CSS3, Javascript und SQL Light (im weiteren zusammengefasst unter HTML5) mittlerweile vollwertige Apps als mobile Webseite umgesetzt. Solche HTML5-Apps weisen einen mit nativen Apps vergleichbaren Funktionsumfang auf, können auf Systemkomponenten zugreifen, werden wie native Apps als Icon auf dem Homescreen hinterlegt und können sogar offline aufgerufen und verwendet

werden. Der Vorteil von HTML5-Apps im Vergleich zu nativen Apps ist der verringerte Entwicklungs- und Serviceaufwand für Apps, die auf mehreren Systemen (bspw. Android, iOS und Windows Phone 7) verwendbar sein sollen. Im Gegensatz zu nativen Apps werden optimierte Webseiten und HTML5-Apps nicht über eine zentrale Distributionsanwendung bezogen, sondern über die Eingabe einer URL im Browser des mobilen Geräts aufgerufen und über die Funktion „Add to Homescreen“ am Homescreen als Icon hinterlegt. Als grösster Nachteil von HTML5-Apps kann somit genannt werden, dass sie nicht in den gängigen App-Stores auffindbar sind und damit von vielen Nutzern nicht wahrgenommen werden. Eine Abhilfe zu dieser Problematik bieten Entwicklungsumgebungen wie PhoneGap oder Titanium, die es erlauben, aus dem HTML5-App-Quellcode native Apps für die gängigsten Betriebssysteme zu erzeugen. HTML5-Apps können damit direkt in native Apps übersetzt werden und auf den jeweiligen App-Stores angeboten werden. Ein weiterer Vorteil ist, dass die Anwender nicht explizit Updates installieren müssen, sondern immer den aktuellsten Stand benutzen bzw. aufrufen.

2.3.3 Hybride Apps

Hybride Apps bilden eine Zwischenform der beiden Alternativen mobile Webseiten und native Apps. Bei hybriden Apps handelt es sich meist um native Apps, die mobile Webseiten für gewisse Funktionen integrieren. Die native App beinhaltet dabei ein Browser-Fenster, um die mobile Webseiten „versteckt“ einzubinden. Den extremsten Fall bilden dabei sogenannte Wrapper-Apps. Damit werden Apps bezeichnet, die nicht alleine ausgeführt werden, sondern nur mit einem anderen vollständig entwickelten Programm zusammen. So werden bspw. native Apps entwickelt, die über den gesamten Bildschirm einen Browser ohne Eingabeleisten beinhalten und in diesem die eigentliche Applikation (eine mobile Webseite) aufrufen. Als mobile Webseiten entwickelte Apps können somit nahtlos in native Apps übernommen und integriert werden. Der Vorteil von hybriden Apps ist, dass gewisse Funktionen ausgelagert werden können und nur einmal für alle Systeme implementiert werden müssen. Die als mobile Webseite umgesetzten Funktionen sind im Gegensatz zu in nativen Apps implementierten Funktionen mit mehreren System kompatibel). Ein weiterer

Vorteil ist, dass bei einem Release-Wechsel für diese Funktionen kein Update der nativen App notwendig ist und die Nutzer immer auf den aktuellsten Stand zugreifen.

2.4 Mobile Web-2.0-Dienste

Neben den Geräteklassen und der technischen Umsetzung von Apps, können ebenfalls mobile Web-2.0-Dienste klassifiziert werden. [Martignoni und Stanoevska-Slabeva 2007] unterscheiden zu diesem Zweck zwischen Mobile-Enabled Web-2.0-Dienste und Stand-alone Web 2.0 Apps. Als Mobile-Enabled werden bestehende Dienste bezeichnet, die einen mobilen Zugriff erlauben bzw. deren Funktionsumfang sogar durch den mobilen Zugriff erweitert wird. Stand-alone Web 2.0 Apps sind hingegen Apps, die den Web-2.0-Prinzipien entsprechen und rein auf den mobilen Einsatz abzielen. Bezogen auf diese Klassifizierung werden im folgenden Kapitel Anwendungsfälle beschrieben und reflektiert.

3 Anwendungsfelder

Gleich ob B2E, B2B oder B2C, innovative Apps sind in allen Bereichen zu finden und tragen zur effektiven Neugestaltung von Geschäftsprozessen und sogar ganzen Geschäftsmodellen bei. Sowohl der mobile Zugriff wie auch die neuen Möglichkeiten, die durch die mobilen Endgeräte angeboten werden, sind für bestehende Web-2.0-Dienste überaus relevant. Egal ob Wikipedia, Twitter, Facebook, Slideshare, YouTube oder Google Reader, beinahe alle bekannten Web-2.0-Dienste bieten mittlerweile einen für mobile Geräte optimierten Zugang an. Dabei werden meist native Apps und optimierte Webseiten parallel verwendet, um eine möglichst hohe Reichweite und Kompatibilität mit mobilen Geräten zu erreichen. Dieser Aufwand zeigt bereits, wie wichtig mobile Nutzer für die etablierten Web-2.0-Dienste sind. So kann Facebook zum Stand 2011 auf mehr als 350 Millionen mobile Nutzer verweisen, womit über 40 % aller Benutzer Facebook auch von mobilen Geräten aus verwenden. Mobiler Zugriff gehört damit für die meisten Web-2.0-Dienste bereits zum Standard, weshalb im

Folgenden exemplarisch einige Anwendungsfälle beschrieben werden, bei welchen der Funktionsumfang durch mobile-spezifische Eigenschaften erweitert wurde oder es sich überhaupt um eine eigenständige Web 2.0 App handelt.

3.1 Wiki Talking Tours

Wiki Talking Tours (WTT) ist ein Beispiel für ein Mash-Up, welches erst durch den mobilen Einsatz ermöglicht wurde. WTT benutzt die Ortungsfunktion und Möglichkeit zur automatischen Sprachausgabe von Text, die von modernen Smartphones angeboten wird, und kombiniert dies mit Wikipedia-Einträgen. Da Wikipedia-Einträge, bspw. von Gebäuden oder wichtigen Orten, mit einer Position in der realen Welt verbunden werden können, nutzt WTT diese Positionsangaben, um je nach aktuellem Aufenthaltsort einen entsprechenden Audio-Guide zu erstellen. Bei einem Spaziergang durch die Stadt liest diese App dem Anwender passend zu seinem Aufenthaltsort die relevanten Wikipedia-Einträge vor.

3.2 News-Aggregator Flipboard

Die Kombination aus einer angenehmen Anzeige- bzw. Gerätegröße und der Multi-Touch-Eingabe hat News-Aggregatoren als Ersatz für die tägliche Zeitung einen neuen Aufschwung verliehen und zu sehr beliebten Apps wie Flipboard geführt. Flipboard ist für das iPad entwickelt und fasst verschiedene RSS- aber auch Activity-Streams aus Twitter, Facebook, Flickr, YouTube usw. zusammen, um sie wie eine individuell zusammengestellte illustrierte Zeitung mit Multi-Media-Unterstützung aufzubereiten. Mit einer einfachen Handbewegung kann durch die letzten Nachrichten aus sämtlichen Kanälen geblättert, interessante Beiträge markiert oder weitergeleitet und Videos direkt abgespielt werden. Jeder Anwender erhält damit eine Zusammenfassung der für ihn interessanten Informationen in einer hochwertig aufbereiteten Form. Die Vorteile gegenüber herkömmlichen Magazinen und Tageszeitungen sind klar und die Implikationen für die Herausgeber bereits spürbar. Gerade für Verleger sind damit auch weiterhin in Zukunft weitgehende Veränderungen absehbar.

3.3 My Handicap App und Boston CitizensConnect

Viele spezielle Informationen wie Details über behindertengerechten Zugang zu Gebäuden, Schlaglöchern auf öffentlichen Strassen, die ausgebessert oder Graffitis, die entfernt werden müssen, können effizient und zeitnah per Crowdsourcing-Ansatz aufgenommen und registriert werden, ohne damit einen grossen Aufwand für einzelne zu erzeugen,. Gerade mobile Crowdsourcing-Apps sind dafür gut geeignet, sind die Endgeräte zur Aufnahme der Information doch immer dabei und können einige wichtige Informationen bereits über Sensoren erfasst (wie bspw. die Position) und um aussagekräftige Fotos ergänzt werden. So hilft die App von My Handicap, Personen mit Beeinträchtigung detaillierte Informationen und Fotos über behindertengerechte Zugänge zu Gebäuden zu erfassen und diese öffentlich zu teilen. Es entsteht eine umfangreiche Datenbank, auf welche die Nutzer jederzeit über die App zugreifen können. Der Alltag für beeinträchtigte Personen kann dadurch stark vereinfacht werden. Ein weiteres Beispiel ist die App Boston CitizensConnect, welche es erlaubt, Anfragen, z.B. zur Ausbesserung von Schlaglöchern und ähnlichem, an die Stadtverwaltung zu melden – direkt vom Mobiltelefon, automatisch mit GPS-Ortsangabe und Foto im Anhang. Die Anfrage wird ebenfalls durch die automatisch aufgenommene Positionsangabe an die richtige Abteilung bzw. die für den jeweiligen Bezirk oder Strasse zuständige Organisationseinheit weitergeleitet. Sowohl die Effizienzsteigerung auf der Seite der Stadtverwaltung wie auch der Mehrwert für die Kunden, also die Bewohner der Stadt, sind offensichtlich.

3.4 Twitter als mobile App

Besonders der Microblogging-Dienst Twitter hat in letzten Jahren eine Ausrichtung auf mobile Anwendungen forciert. Mittels Twitter und den dort verwendeten Hash-Tags ist es einer losen Gruppe von Menschen möglich, Diskussionen oder weitere Information zu einem gerade stattfindenden Ereignis zu führen bzw. zu teilen. Twitter ist daher bei Grossveranstaltungen oder Konferenzen sehr beliebt; es kann somit ein zweiter Kommunikationskanal für Interessierte etabliert werden. Dies wird durch die kurze Form der Nachrichten

sowie den mobilen und damit beinahe allgegenwärtigen Zugriff auf Twitter ermöglicht. Als neue Erweiterung ist es mittlerweile ebenfalls möglich, Tweets automatisch mit seiner aktuellen Position versehen zu lassen. Damit können Tweets zu einem Thema ebenfalls über den Ortsbezug gefunden werden.

Ein weiterer Vorteil von Twitter, das sehr zeitnahe Kommunizieren (Kommunikation in Real-Time), wird ebenfalls durch den mobilen Zugriff gefördert. Unerwartete Ereignisse oder Katastrophen werden oft direkt von den Betroffenen per Twitter kommuniziert. Eine Erweiterung der Twitter App macht es möglich, Fotos, die bspw. mit dem Smartphone gerade auf-genommen wurden, direkt an Tweets anzuhängen. Ein Beispiel dafür ist der Absturz eines Airbus im Hudson-River nach dem Start in New York. Der Zwischenfall wurde als erstes – sogar mit Foto – über Twitter von einem Fahrgast einer zufällig vorbeifahrenden Fähre berichtet.

3.5 Native Integration von Web-Diensten in mobile Betriebssysteme

Eine Herausforderung für den Einsatz von Web-2.0-Diensten im Unternehmen ist die zentrale Verwaltung bzw. der Abgleich von bei verschiedenen Diensten hinterlegten Informationen und Dateien. Tendenziell sind diese Informationen und Dateien oft gerade „on-the-move“ relevant und nützlich bzw. gehören wie etwa Kontaktinformationen (Telefonnummer, E-Mailadresse, Anschrift, usw.) zu den Grundinformationen, die auf Mobiltelefonen hinterlegt sind. Dieses Potential von sich automatisch abgleichenden Informationen und Dateien wurde von Betriebssystementwicklern erkannt und teilweise bereits weitgehend umgesetzt. Moderne Smartphone-Betriebssysteme integrieren nativ Informationen aus LinkedIn, Facebook, Twitter, Windows Live und diversen Google-Diensten, um somit Informationen zu Kontakten und Veranstaltungen aber auch Fotos und letzte Statusmeldungen synchron in die entsprechenden Apps einzubeziehen.

Auch der mobile Zugriff auf unternehmensinterne Kollaborationsplattformen und die automatische Synchronisierung mit dem Smartphone wird bereits teilweise nativ angeboten.

4 Nutzen und Herausforderungen

Eines der grössten Nutzenpotentiale für erweiterte Funktionen durch mobile Geräte ist die Möglichkeit, über den mobilen Zugriff neue Meta-Informationen zu einem Sachverhalt zu erhalten und damit besser auf den Kontext bezogene Informationen zu generieren. Dieses Potential entspricht den Web-2.0-Prinzipien von datengetriebenen Anwendungen und der Nutzung kollektiver Intelligenz [O'Reilly 2005]. Vermeintlich unstrukturierte Daten können so durch Meta-Informationen erweitert und nutzbar gemacht werden. Sind bspw. der aktuelle Aufenthaltsort und die Uhrzeit in Kombination mit dem Terminkalender verfügbar, können Informationen passend auf den momentanen Kontext bereitgestellt werden. Es werden dadurch Szenarien möglich wie die automatische Information an Besprechungsteilnehmer, dass ein Teilnehmender verspätet ist, aber sich auf dem Weg befindet, oder wie dem automatischen Einrichten einer gemeinsamen Datenablage für die Teilnehmenden einer Besprechung. Kontextbezogene Informationen bieten daher ein hohes Potential, sind aber dennoch oft schwer realisierbar, da meist eine umfangreiche Integration von verschiedenen Daten-quellen nötig ist. Im Business-2-Employee (B2E)-Bereich können Mitarbeitende durch mobile Geräte unterstützt werden, um Geschäftsprozesse effizienter zu gestalten. In vielen Fällen ermöglicht die mobile Unterstützung sogar die komplette Neugestaltung von bestehenden Geschäftsprozessen und damit eine überhaupt effektivere Umsetzung von Prozessen oder gar gesamten Geschäftslösungen. Beispiele für solche effektiv neu gestalteten Geschäftsprozesse sind etwa Ticketing-Apps von Fluglinien. Durch den Check-In und das Ticket am Mobiltelefon können die Kontaktpunkte verringert werden, und die schnellere Abwicklung generiert einen deutlichen Mehrwert für den Kunden. Die Herausforderung liegt somit weniger in der Verbesserung von bestehenden Prozessen, sondern mehr in der kompletten

Neugestaltung unter den Gesichtspunkten der neuen Möglichkeiten durch moderne mobile Endgeräte.

Eine andere Herausforderung bei der Konzeption von Apps für Geschäftsanwendungen ist der teilweise noch nicht vollkommen gegebene mobile Internetzugang. Die grösste Herausforderung hierbei bilden teure Daten-Roaming-Gebühren im Ausland. Im Vergleich zu flächenmässig grossen Ländern wie den USA ergibt sich für Europa hier ein Wettbewerbsnachteil wegen der heterogenen Mobilfunkanbieterlandschaft. In diesem Bereich sind Verbesserungen für die Nutzerschaft absehbar; die EU arbeitet bereits an entsprechenden Richtlinien.

5 Weiterentwicklungen

Die Bedeutung der Integration von kontextbezogener Information in unseren Alltag und die Allgegenwärtigkeit von Computern wurde bereits Anfang der 90er-Jahre von Wissenschaftlern am Palo Alto Research Center (PARC) erkannt und dafür der Begriff Ubiquitous Computing geprägt. Mit dem Aufkommen und der schnell steigenden Verbreitung von Smartphones ist unsere Realität dieser Vision fast unbemerkt näher gekommen und es kann davon ausgegangen werden, dass dieser Trend auch in Zukunft weiter anhalten wird. Zukunftsvisionen wie jene von Microsoft zeigen klar, dass die führenden IT-Unternehmen an einer umfangreichen und tiefen Integration von Computern und Informationssystemen in unseren Alltag arbeiten. Dabei verschmelzen die Realität und das Internet immer weiter und so wird auch die Zukunft des Web 2.0 von Tim O'Reilly in dieser Entwicklung gesehen: dem Web Squared.

Fünf Jahre nach der Definition von Web 2.0 [O'Reilly 2005] haben Tim O'Reilly und John Battelle sich damit befasst, ob die Web-2.0-Prinzipien im Hinblick auf die Entwicklungen der letzten Jahre aktualisiert werden müssten. Unter dem Begriff „Web Squared“ haben sie aktuelle Veränderungen aufgezeigt und auch einen Ausblick auf die Zukunft gegeben [O'Reilly und Battelle 2009]. Web Squared wird dabei durch diese vier Aspekte bzw. Prinzipien repräsentiert, die im Folgenden anhand von Beispielen erläutert werden:

1. Kollektive Intelligenz und sensorischen Informationen,
2. Lernfähigkeit des Webs,
3. „Information Shadow“ und Internet der Dinge,
4. Real-Time-Web.

Generell treffen diese Prinzipien auf jene Web-2.0-Dienste zu, die durch den mobilen Zugriff an Funktionalität gewonnen haben. Sie können teilweise in den bereits genannten Anwendungsfällen wiedergefunden werden.

Das erste Prinzip findet sich so etwa in den Beispielen zu den Apps von My Handicap und Boston CitizensConnect wieder. Durch Informationen, die automatisch über Sensoren erfasst werden, können Crowdsourcing-Anwendungen deutlich effizienter umgesetzt werden. Geschäftsanwendungen, die dieses Prinzip nutzen, finden sich bspw. in der Versicherungsbranche. Bereits eine Vielzahl von Versicherungen bieten Apps an, die es den Kunden ermöglichen, direkt beim Schadensfall eine Schadensmeldung über die Versicherungs-App aufzunehmen. Die App bestimmt dabei automatisch die Position des Schadenfalls (bspw. bei einem Autounfall) und ermöglicht das Anfügen von Fotos.

Für das zweite Prinzip führen [O'Reilly und Battelle 2009] die iPhone App „YOU R HERE“ als Beispiel an. Mit dieser App können Benutzer Übersichtskarten, bspw. einer Golfanlage, fotografieren und auf dem Foto ihre aktuelle Position eintragen. Haben sie ihren Ort in der realen Welt gewechselt, können sie die neue Position ebenfalls im Foto markieren und die App berechnet bzw. kombiniert für alle weiteren Punkte auf dem Foto bzw. der fotografierten Karte die passenden Geokoordinaten. Somit hat die App nach der Eingabe von zwei Punkten gelernt, das zuerst unstrukturierte Foto zu strukturieren und kann somit eine Navigation auf dieser Karte bzw. dem Foto anbieten. So werden aus der expliziten Eingabe von zwei Punkten die restlichen Punkte implizit gelernt.

Das dritte Prinzip findet sich bei der App Talking Wiki wieder. Zu vielen Objekten im realen Leben existieren Informationen im Internet (der sogenannte „Information Shadow“). Diese Informationen (bspw. ein Wikipedia-Eintrag zu

einem Gebäude) werden von Talking Wiki per Audioausgabe dem Benutzer verfügbar gemacht. Der „Information Shadow“ kann jedoch auch visuell über sogenannte Augmented Reality Apps (erweiterte Realität) sichtbar gemacht werden. Beispiele dafür sind etwa Wikitude oder Layar: Apps welche es erlauben, „durch“ die Kamera zu blicken und für die jeweiligen Objekte im Blickfeld passende Informationen aus dem Internet zu erhalten. Auf dem Bildschirm des Smartphones oder Media Tablets wird dazu ein Live-Bild der rückseitigen Kamera (also ein Live-Bild in die Richtung, in welche man blickt) angezeigt. Über den integrierten Kompass in Kombination mit den Lagesensoren und dem GPS-Modul weiss die App, in welche Richtung das aktuelle Bild zeigt bzw. welche Geokoordinaten sich im Blickfeld befinden. Das Blickfeld kann so mit den passenden Informationen aus dem Internet, vorausgesetzt sie verfügen über eine Ortsangabe bzw. einen Ortsbezug, erweitert werden. So können nicht nur Wikipedia-Einträge eingeblendet werden, sondern bspw. auch Webcams, Informationen zu Berggipfeln, Öffnungszeiten von Geschäften oder der schnellste Weg zum nächsten Geldautomaten (bspw. der Postomat-Finder der Schweizer PostFinance App). Die Einsatzmöglichkeiten sind sehr weitreichend und weisen ein hohes Innovationspotential auf.

Das vierte Prinzip steht stellvertretend für die Transformation von Twitter hin zu einem wahren Real-Time-Medium. So wird es möglich, Informationen sehr zeitnah an eine grosse Anzahl von Empfängern zu verschicken, die sich die relevante Information selbst auswählen. Dieses Prinzip steht stellvertretend dafür, dass Ereignisse in der realen Welt – egal wo sie passieren – theoretisch sofort erfasst sind und Informationen dazu über das Internet bezogen werden können.

In diesem dynamischen Umfeld sind sowohl die Anwendungsideen als auch die Technologie noch am Anfang ihrer Entwicklung. Gerade aus diesem Grund sollte diesen teilweise noch futuristisch wirkenden Prinzipien Aufmerksamkeit gewidmet werden, kann in diesem Bereich bereits heute ein hohes Innovationspotential in Kombinationen mit grossen Investitionssummen festgestellt werden.

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Contribution B: Success and Failure: Two Longitudinal Case Studies on Media-Tablet Usage in CRM

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Table 5: Bibliographical Information for Contribution B.

Abstract

Media-tablets are gaining widespread acceptance in companies and are increasingly being used for various business tasks. However, although there are several successful examples, a growing number of media-tablet projects get turned down. Based on case study data covering one year, this paper presents two projects that introduced a front office customer-relationship-management application for media-tablets. For each case, we conducted expert interviews in 2011 and 2012 with both the project manager and internal client of the project, documented the existing solution, and conducted a user survey. Over the time frame, the two projects evolved differently in terms of success. While one project was further advanced, the other had in fact been turned-down completely

by management. A comparison of the cases reveals that the successful project was funded by an operating department, and the advantages of the solution had been communicated to all internal stakeholders. In contrast, the other project was driven primarily by user demand for media-tablets and was executed as an innovation project without a clear business rationale. Therefore, we advise managers to ensure that media-tablet projects follow a well-defined business logic and to communicate the advantages to all relevant internal stakeholders.

Keywords

Consumerization of IT; Media-tablet; Mobile Computing; Case Study Research.

1 Introduction

In 2010, the market for tablet computers was revitalized with the introduction of a novel class of devices, so-called media-tablets, in the form of products such as the Apple iPad and other gesture-interaction based tablet computers. Besides the novel interface-concept, these devices are ideally suited for entertainment purposes and enable a user-friendly and intuitive computing experience. Both the hardware and software of media-tablets are not intended for professional usage. However, besides their remarkable success as entertainment devices, there is also a broad agreement across many IT consultants (Akella et al. 2012), technology advisors (Frost & Sullivan 2011a; Willis 2011), software (Sybase Inc. 2011) and hardware vendors (Apple Inc. 2011), IT magazines (Kontzer 2012), and scholars (Pitt et al. 2011a) that the media-tablet also has the potential to create remarkable business value for organizational usage. For example, Frost & Sullivan forecasts that one of the major challenges for IT departments in the upcoming years will be to support and maintain an integrated working environment consisting of smartphones, media-tablets and laptop computers (Frost & Sullivan 2011b). The IT advisory company Gartner reports that at their December 2010 Infrastructure and Operations Conference, 85% of the audience expected to support media-tablets at the work place in the near future, and 48% were already doing so (Cosgrove 2011). This fast growing demand for the professional use of media-tablets is also evident in the strategy of leading

business software vendors, which have already released the first tablet versions of their business solutions. Brand names like SAP, Oracle, Siemens and salesforce.com are just a few vendors which now offer media-tablet versions of their business software (Nelson and Willis 2011). Not surprisingly, Gartner names the media-tablet as the “number one” strategic technology trend for 2012 (Cearley and Claunch 2012).

Following this broad agreement and the widespread buzz, organizations of any size and any industry are instigating IT projects to employ media-tablets for a variety of business activities (Frost & Sullivan 2011a; Kontzer 2012) and, hence, making considerable investments that demand a return. Despite these initiatives, the main focus of a media-tablet remains on entertainment. To effectively employ media-tablets for business purposes, organizations first have to explore the suitability, areas of operation and business value of the technology. This has led to a situation in which many organizations approach this issue on a trial-and-error basis, which leads to an inefficient adoption process characterized by uncertainty, the risk of failure, and lost investments.

In order to improve the prevailing processes, one way is to foster the exchange of experiences with the adoption of media-tablets in business. In this context, research can act as a facilitator for knowledge transfer and support practice by deriving recommendations and guidelines from empirical studies. From an academic perspective, the adoption of media-tablets in business is also of relevance and has so far not been researched. While previous studies (Gebauer et al. 2010; Kadyte 2004; Sheng et al. 2005) explored the impact of various mobile devices on business processes, most have the same shortcoming; they were done before the introduction of the media-tablet and focus primarily on the aspect of mobility. However, besides increased mobility, the media-tablet also offers additional features that can lead to value gains. Accordingly, several contributions in the field of information systems research (Pitt et al. 2011b, 2010; Watson et al. 2011) indicate that the differences between media-tablets and their predecessors are evident. Hence, research concerning media-tablets in particular, will contribute to existing knowledge on the adoption of mobile devices. To investigate this issue, we explore the following research question:

What factors contribute to a successful adoption of media-tablets for professional business usage?

According to Gartner, the media-tablet has significant implications in customer-relationship-management (CRM), and many companies are promoting the adoption of media-tablets to enhance their CRM systems (Desisto 2011; Dunne 2011). In order to answer the research question, we conduct research on cases where different companies adopt media-tablets to support their CRM. For each case, we collect information in telephone interviews with project managers and internal clients, by reviewing documents, and conducting questionnaire-based user-surveys over the course of one year (2011 – 2012). Using a comparative case study approach, we derive recommendations for practice and contribute to a broader understanding of corporate mobile IT usage and to the existing theory of mobile IT adoption in business.

The remainder of the paper is organized as follows. Section 2 contains an introduction on related work and theory, and defines theoretical propositions. Section 3 discusses the methodological approach, the case selection, and case study protocol. Section 4 reports on the two cases, both independently and comparatively. Section 5 discusses the results and their implications for theory and practice, as well as the limitations of the study and opportunities for future research.

2 Theoretical Framework

To formulate the study methodology and set the scope, we follow the recommendation of Yin (2003) and start with theory development as part of the design phase. The goal is to have a sufficient blueprint for the case study.

2.1 Theoretical Background

In general, media-tablets can be seen as an alternative to two other types of mobile devices, namely laptops and smartphones (Pitt et al. 2011b). Basically, it is a tablet-form-factor device with a seven to twelve inch color display, running

a lightweight operating system. The human-computer-interface primarily relies on touch gestures and a virtual keyboard instead of a built-in hardware keyboard, leading to advantages in form, weight and ease of use (Pitt et al. 2011b). One of the most well-known media-tablet products is the Apple iPad.

Like smartphones and laptops, media-tablets are also capable of running customized enterprise-standard applications. We will focus on applications that support CRM, so-called IT-based customer solutions, such as sales force automation (Payne and Frow 2005). To categorize the different aspects of CRM, we apply a business-processes-oriented perspective, based on the CRM framework of Payne and Frow (2005) as illustrated in Figure 13. This framework encompasses five main CRM processes: (I) the strategy development process, (II) value creation process, (III) multichannel integration process, (IV) information management process, and (V) the performance assessment process. Based on this categorization, we further define the scope of our research and discuss the influence of media-tablets on CRM.

As we focus on applications, we start with the (IV) information management process. This process includes the data basis and back-end system (data repository) of the CRM, the IT infrastructure and middleware (IT systems), analysis tools, and applications. The applications are divided into two domains, front office and back office software applications. In this study, we focus on the use of media-tablets for front office applications.

Front office applications support certain customer communication channels and therefore have an impact on associated areas in the (III) multichannel integration process, which includes six generic channels ranging from physical to virtual. This is where the interaction with the customer takes place. Media-tablet applications can potentially be employed for most of the channels: sales force, outlet personnel and telephone staff can be supported by media-tablet applications; eCommerce, and mCommerce by software applications provided to customers on public App Stores (application distribution platforms such as the Apple App Store or Google Play). In this study, we focus on media-tablet applications that are tailored to support the CRM activities of the sales force.

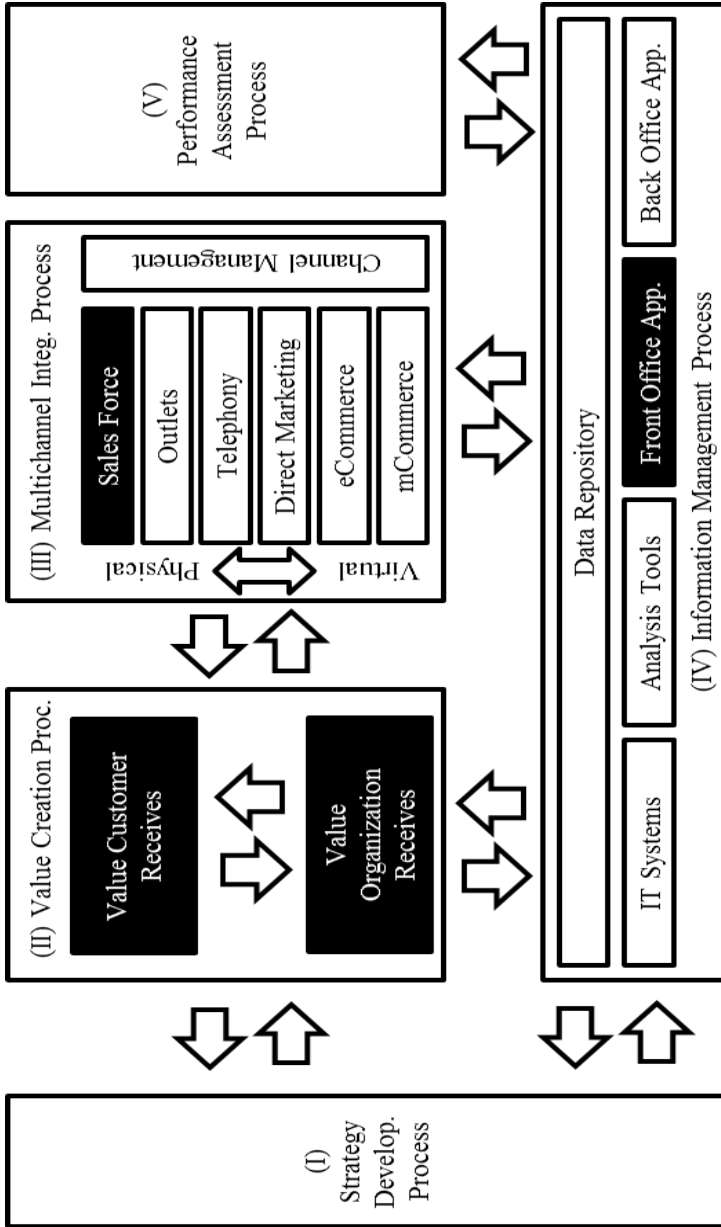


Figure 13: A Conceptual Framework for CRM, adapted from Payne and Frow (2005). Black Boxes indicate the Context of the Research.

The interaction with customers through channels creates value and therefore influences the (II) value creation process. The value creation process is two-sided: CRM creates on the one hand value for the customer (value the customer obtains), and on the other hand for the company (value the organization obtains). The customer receives value as the information gathered through the CRM process contributes to the value proposition of the service or product of the company. Precise information about customers allows companies to offer added value (for example, if an insurance company knows that a customer plans to go on a long trip, they can remind him to take out an appropriate insurance policy) and customized products and services (for example, offers that are tailored to the requirements of the particular customer). Such information leads to superior products and services and thus creates customer value. This is also termed the coproduction of customer value (Payne and Frow 2005). In turn, the CRM system also creates value for the company. The major benefits of CRM for companies are the acquisition of potential customers and the retention of existing ones. In conjunction with this, many authors also refer to customer retention rates and customer share as the most important metrics for CRM success (Verhoef 2003). If a front office application creates value, it would evolve in this process area.

For the remaining two CRM processes, (I) strategy development and (V) performance assessment, we assume that a media-tablet application does not influence them. In summary, we will focus on front office media-tablet applications for the sales force and their contribution to the value creation process of CRM. The areas of interest are marked in Figure 1 with a black background and white letters.

2.2 Theoretical Proposition

To target our research question, we need to identify factors that influence the success of media-tablets in the described CRM process areas (II), (III), and (IV). We define success as the creation of a relative advantage of the new applications compared to their predecessors. In the case studies, we will therefore identify factors that influence the creation of a relative advantage of the media-tablet

application. Besides creating a relative advantage, research also indicates that for a successful adoption, the communication of advantages to the internal stakeholders of the company is an important factor (Wilson et al. 2002). A successful media-tablet adoption will therefore need to communicate the relative advantage of the new application to the internal stakeholders. For the purposes of this study, we include the internal client, project management and users in this group of relevant internal stakeholders. If all three stakeholders are aware of the relative advantage of the new application, this will support a successful adoption. Based on this notion, we formulate the following theoretical proposition to guide our case study:

The case study will demonstrate why implementation only succeeds when the media-tablet solution creates a relative advantage that is properly communicated to all related stakeholders. In addition, the case study will also show that simply porting the existing CRM front office application to media-tablets is not sufficient to ensure a successful implementation.

3 Methodology

In a first step, we define a set of criteria for determining appropriate projects to select our case studies. First, we consider only media-tablet solutions that are currently in use or have been tested under real conditions. Second, only companies that have implemented a CRM front office media-tablet application for the sales force are considered. Third, the solution has to be a tailor-made iPad-based application.

Next, we contacted partner companies of our institute to identify companies with appropriate projects that would be willing to participate in the study. Out of those who replied or responded, we selected three cases and reviewed the project descriptions to select applications with comparable functionalities and objectives. Finally, we selected two cases that can be considered as comparable in both aspects of functionality and objective.

To assess the theoretical proposition and the research question, we define an appropriate form of measurement, namely a case study protocol that considers the adoption of a CRM front office media-tablet application for the sales force. To obtain this information, we introduced two perspectives: those of management and of users. The management perspective gathers information about the application from the project managers and internal clients; the user perspective gathers information from the users of the solution.

The case study protocol encompasses both perspectives. Basically, the case study protocol is a standardized categorization for collecting and organizing data (Yin 2003). To define the case study protocol, we integrate the aspects included in the CRM framework by Payne and Frow (2005) and the aspect of project communication defined by Wilson et al. (2002) into one categorization scheme that includes: (1) the relative advantage of the front office application, (2) the relative advantage for the sales force channel, (3) the relative advantage in the value creation process, and (4) the project communication. These four categories represent the case study protocol.

3.1 Interviews

To assess the management perspective, we conducted semi-structured telephone interviews with the project managers and the internal clients of the project. The interviews were audio-recorded and transcribed, and lasted about one hour. An interview guide based on the case study protocol was created in order to help to keep the focus on the key elements of the interview, while still allowing some room for an open conversation (Mayer 2009). For each case, we conducted an interview in 2011 with the project managers and reviewed the application. In case Alpha, we conducted two additional interviews in 2012: one with the project manager and one with the internal client. Regarding case Beta, we were not able to conduct an interview in 2012 with the project manager or the internal client, as the whole project team left the company and the project was also turned down in 2012. Therefore, we contacted other employees in the IT department of the company and received additional information by email about the latest project status.

3.2 User Survey

To assess the user perspective, we employed a quantitative questionnaire. The questionnaire was sent out to the users by email. Users had to rate predefined statements based on the level of acceptance. We used a verbal five-point Likert scale to reduce the time required for answering and thus maximize the response rate. We formulated the questions for the survey by using previously validated measures derived from the literature (Delone and McLean 1992, 2003; Gebauer and Shaw 2004; Gebauer et al. 2010; Lee and Chung 2009; Petter et al. 2008). For quality assurance, each question was tested and validated with the question appraisal system of Faulbaum et al. (2009) by members of our faculty. All items in the questionnaire are listed in Table 1. In total, we received 67 answers, 61 from case Alpha (45% response rate) and 6 from case Beta (100% response rate).

To ensure measurement quality and accuracy, we applied an explorative factor analysis (varimax principal component analysis with Kaiser standardisation). The results are presented in Table 6 and Table 7. Based on this analysis, the items mostly proved valid, except for the separation between (3) relative advantage in the value creation process and (4) project communication. However, given that we apply descriptive statistics and that the used items are logically distinguishable from one another, we accept the results as valid.

Case Beta		Case Alpha		Factor Analysis			Items for User Perspective		Category
STD	Mean	STD	Mean	4	3	2	1		
0.4	4.8	0.5	4.5	0.16	0.16	-0.1	0.8	The iPad is mobile.	(1) Relative advantage of the front office application
0.4	4.8	0.5	4.7	-0	0.19	0.13	0.8	The iPad can instantly be used.	
0.5	4.5	0.6	4.5	0.08	0.17	-0	0.7	The iPad is easy to operate.	
0.8	4.5	0.6	4.3	0.09	-0.2	0.19	0.6	The iPad touch-screen has the ideal size.	
0.5	4.5	0.9	3.4	0.23	0.37	0.7	-0	[...] is available whenever I need it.	(2) Relative advantage for the sales force channel
0.8	4	0.8	3.6	0.24	0.37	0.7	0.11	[...] is reliable.	
0.4	4.8	1.1	3	0.17	0.8	0.14	0.24	[...] enables me to save time.	
0	5	0.9	3.1	0.4	0.8	0.11	0.09	[...] makes my job easier.	
0.4	4.8	1	2.9	0.21	0.8	0.21	0.29	[...] enables me to be more productive.	(2) Relative advantage for the sales force channel
0.7	4.2	1	3.5	0.26	0.7	0.17	-0.1	[...] improves customer perceptions of the quality of service	

Table 6: List of Items ([...] is a Placeholder for the Application Name). Answers range from strong disagreement (1) to strong agreement (5).

Case Beta	Case Alpha		Factor Analysis				Items for User Perspective		Category
	Mean	STD	4	3	2	1			
0.5	4.3	0.6	0.8	0.08	0.37	0.05	[...] provides understandable information.	(3) Relative advantage in the value creation process	
0.5	4.5	0.9	0.9	0.3	0.08	-0	[...] allows me to present information the way I need it.		
0.5	4.7	0.9	0.8	0.3	0.25	0.2	[...] provides relevant information.		
0.6	4	0.8	0.8	0.05	0.28	0.1	[...] provides correct information.		
0.4	3.8	0.9	0.8	0.18	0.35	0.24	[...] provides complete information.		
0.4	4.8	1	0.8	0.4	0	0.11	Overall I am very satisfied with [...].		(4) Project comm.
0.5	4.7	1	0.8	0.42	0.13	0.02	I would strongly recommend [...] to others.		

Table 7: Continued.

4 Results

In this section, we describe the two cases, based on the collected information. The information was derived from four interviews, reviewing the applications, collecting secondary information about the company and the case, a user survey, and email communication. Table 8 gives an overview of the collected information and the time period of collection.

Type of Information	Case Alpha		Case Beta	
	2011	2012	2011	2012*
Interview Project Manager	1	1	1	0
Interview Internal Client	0	1	0	0
Review of the Application	Yes	Yes	Yes	No
Secondary Information (Web Search)	Yes	Yes	Yes	Yes
User Survey	Yes (n=61)	No	Yes (n=6)	No
Project Status Information	Interview	Interview	Interview	Email

Table 8: Overview on Case Information (Case Beta was turned down in 2012).*

4.1 Case Alpha: Financial Service Provider Alpha

Company Alpha is a financial service provider based in Switzerland that delivers professional and personal financial services. Alpha is one of the national leaders in payment transactions and can be considered as a large company, with its more than 1.000 employees. It serves both business (B2B) and private customers (B2C) by offering services such as payments, investments, financing and retirement planning. In order to maintain its leading position, Alpha aims to play a pioneering role in the implementation of IT solutions. The researched media-tablet solution aims to support the sales force designated for business customers (B2B) with mobile CRM functionality. Therefore, the users of the application are B2B sales agents. In 2011, when we first contacted the company, the application had already been rolled out to all of

the 150 B2B sales agents after a closed pilot project in 2010. The application had been in use for more than one month.

Concerning the relative advantage of the (1) front office application, the internal client and the project manager agree that the new application has the same functionality as the predecessor, which is still used parallel as a desktop application. In fact, it is just a tablet-optimized version of the existing CRM application. The application includes a profile of each customer, including different status information such as hard-facts (financial key figures) and soft-facts (planned next steps). In addition, the application is capable of triggering certain activities such as ordering offers, credit cards, or signing contracts. Before the introduction of the media-tablet, all these actions were paper-based. Hence, the sales agent used printed paper forms for each activity, which were filled out together with the client and faxed after the meeting to the back office. Therefore, the new application creates efficiency gains with the reduction of media breaks, as these activities are now done electronically using the media-tablet. From the user perspective, the results display a high level of satisfaction with the used media-tablet hardware (see Table 1) and moderate satisfaction concerning the application.

In addition, the reduction of media breaks also led to efficiency gains in the (2) sales force channel. Before the introduction of the media-tablet, the use of laptop computers was not permitted during client meetings: “We have this guideline for our sales agents, which says that it is not recommended to use a laptop during a client meeting. When the sales agent opens his laptop, this creates a psychological barrier between him and the client. But with a tablet, this is not a problem at all.” (Head of Sales Business Clients)

This led to a situation in which the sales agent had to print out the information concerning the client before the meeting. New information regarding the client was then added to the CRM system after the meeting. With the new solution, all the information is available during the meeting and new information is easily added there and then, increasing the efficiency of the sales agent. However, from a user perspective, the results display only moderate satisfaction. The users disagree especially with the statement that the application increases their

productivity (mean of 2.9), which is in contrast to the perceptions of management.

Concerning (3) value creation, we find evidence from the management perspective that an increased information quality positively influences value creation, as the sales agent now has all the information with her/him in the meeting. It is also indicated that the client saves time, because she/he does not need to enter standard information. For example, if the client orders a new credit card, he only has to select the right option on the media-tablet, sign, and click “send”. Before, the client had to fill out a paper form that included standard information, such as company name, company address, and bank account information. However, in terms of the user perspective, satisfaction with the information quality is rated as moderate to weak.

Regarding the (4) project communication, the project received support from top-management and was triggered top-down: “It was in the interest of management that we evaluate business cases for the professional use of media-tablets. For us, it was not about using the iPad, but about gaining experience in how to use media-tablets for our business and how to create sustainable business value.”(Project Manager)

The users and the internal client had been also very open to the project: “This is an important project to us. Our company wants to be the industry leader in innovation and technology and it was therefore clear for everyone that we will gain our own experience with this new technology.” (Head of Sales Business Clients)

In 2011 and 2012, the internal client and the project manager agreed that the project is a success and that the application will be further advanced and also rolled-out to the private customer segment in 2013. However, concerning the user survey from 2011, the results display only moderate satisfaction with the application.

4.2 Case Beta: Hearing Aid Manufacturer Beta

Company Beta develops, produces, and distributes advanced personal hearing systems. The company is one of several hearing aid providers in Switzerland. Beta sells its products through business partners and can be considered a large company, with its more than 1.000 employees. The media-tablet solution has been developed to support the sales force with a mobile CRM front office application. Therefore, the users of the applications are B2B sales agents. The main job of the sales agents is to sell products to the business partners (mainly retailers or “hearing studios”). When we started the data collection in 2011, the project had a closed pilot status and included six volunteer sales agents that had used the new media-tablet application for more than one month.

The media-tablet application integrates information about the client and the sales agent (selling history and key figures), an electronic product catalog, and the functionality to sign-up for a special retailer bonus program (if a certain level of purchases is reached, company Beta would offer a special discount to the client). Therefore, the application represents a new (1) front office application, which includes CRM information and a product catalog. The CRM information is also displayed in new way: “Before, the sales agent had to collect the information from different spreadsheets and even do the calculation by themselves. Now, the App shows the key figures automatically” (Project Manager). This novel information dashboard includes the sales history of a certain client and the sales performance in the current month of the logged-in sales agent.

With this new functionality, meeting preparation has improved in efficiency and quality, which creates an advantage in the (1) front office application and the (2) sales force channel. In addition, the results from the user survey also display high satisfaction in both categories and efficiency gains in the sales force channel: “The new solution has also decreased the paper work for the sales agent and helps her/him to save time.” (Project Manager).

Concerning the (3) value creation process, the management indicated that the device would support the brand image, as company Beta is considered as a high-

tech company selling premium products. But concerning the CRM activities, the solution did not provide additional information during the meeting for either the client (the catalog was always available as website and as print) or the sales agent (the key figures had been available before, but required manual calculation). However, the user survey reveals that the sales agents are satisfied with the information provided by the application.

Regarding the (4) project communication, the project manager explains that the project was driven mainly by the sales agent's demand to use a media-tablet: "We got several requests from our sales agents to provide them with an iPad. To react to this new demand, we decided to start a project to develop an iPad App that would support our sales force" (Project Manager). The project was then launched as an innovation project with a cash burn and without a defined business case or a budget limit. There was also no specific internal client who funded the project as it was not financed by the sales department, but by the general IT innovation budget. In 2012, a steering committee then considered the value of the project and decided to turn it down. The reasoning was that the project costs had been too high to justify the realized business value of the application.

Nevertheless, the user survey indicates that the sales agents had been satisfied with the application. However, given that the project was triggered by the specific demand from sales agents to "use an iPad", this figures are maybe potentially biased.

4.3 Case Comparison

The two projects reveal several differences. While Alpha focused on bringing existing functionality to the media-tablet to allow computer support during the meeting, company Beta indicated that one of their major aims, besides solely reacting to the increasing demand of sales agents to "use an iPad for the job", was to use a device that is more portable than the existing laptop computers: "Our sales agents are very mobile and therefore, it was clear to us that a more portable device would create a competitive edge for them" (Project Manager).

Therefore, concerning the application, Beta achieved more new functionality than Alpha, which merely ported the existing functionality to a new device.

Category	Case Alpha	Case Beta
(1) Relative Adv. Front Office Application	<ul style="list-style-type: none"> Optimized media-tablet version, which allows computer support during the meeting. Decreased media breaks. 	<ul style="list-style-type: none"> Combination of CRM information and a product catalog. Automatic information visualization. Decreased media breaks
(2) Relative Adv. Sales Force Channel	<ul style="list-style-type: none"> Management perceives productivity gains. Users perceive moderate to weak productivity gains. 	<ul style="list-style-type: none"> Project manager perceives productivity gains. Users perceive high productivity gains.
(3) Relative Adv. Value Creation Process	<ul style="list-style-type: none"> Management perceives advantages due to increased information quality and time savings for the client. Users perceive moderate to weak information quality. 	<ul style="list-style-type: none"> Project manager perceives advantages due to a positive image effect of the device. Users perceive high information quality.
(4) Relative Adv. Project Comm.	<ul style="list-style-type: none"> Project was triggered top-down. Received top-management support. No stakeholder rejected the project. 	<ul style="list-style-type: none"> Project was triggered bottom-up. Top-management turned down the project. Top-management rejected the project.

Table 9: Comparison of Case A and Case B.

In both cases, there are indications that the application creates productivity gains. But concerning the degree to which the application influences the meeting situation, the process at Alpha significantly changed, as before sales agents had no computer support at all during the meeting. In the case of Beta, the sales agents already used computers (laptops) during the meeting before the introduction of the media-tablet, which means that the meeting situation has not

changed as much as for Alpha. This is also indicated in the value creation process, where Alpha reports that the sales agents now have better information quality and achieve time savings for their clients. For case Beta, the project manager mostly argues that the positive image associated with the used device also has a positive effect for the company.

Significant differences are also evident in the project communication. While case Alpha was triggered and supported by top-management, case Beta was triggered bottom-up and then turned down by top-management. Also, the funding was different. While Alpha is partly funded with budget provided by the sales department, Beta was not funded by an operating department. Table 9 gives a structured comparison of the cases Alpha and Beta.

5 Discussion and Conclusion

By comparing the two cases, it is evident that each case started and evolved differently. The important role of top-management as proposed by Wilson et al. (2002) is confirmed by the fact that one project had the support of the top-management since the beginning and evolved as an ongoing and so-called “successful” project, while the other was started bottom-up and did not receive top-management support, being turned down after the pilot phase. This indicates that the common guidelines on CRM implementation (Wilson et al. 2002) and IT project management in general are still valid and capable of supporting a successful media-tablet-based CRM implementation. However, the results reveal that both projects achieved some relative advantages in all researched areas. For case Alpha, the evidence shows that all internal stakeholders agreed that the application creates business value for the company. For case Beta, this agreement among the internal stakeholders was not achieved. One influencing factor could be that while Beta was set-up as an innovation project without a predefined business case, Alpha was executed as a project requested by the sales department.

With regard to our research question, we propose that the type of project – an innovation project or one driven by an operating department – is an influencing

factor. In this study, the operating-department-driven project turned out to be more successful than the one labeled as innovation project. We further propose that a clear communication of the relative advantage created by the media-tablet application compared to its predecessor is an important factor in the successful adoption of this new technology. However, we find no support for the proposition that a simple replacement of the existing CRM front office application with a media-tablet-based application would not be sufficient. Case Alpha indicates that even the functionality of the application was not extended, compared to the existing CRM application, the fact that this functionality is now available during the meeting, led to advantages for the sales force channel and the value creation process. Therefore, the media-tablet enabled the existing process to benefit from informational and electronic added-value. Nevertheless, we need to acknowledge that this advantage may be achieved only due to the fact that company Alpha has a guideline not to use laptop computers during client meetings. This circumstance limits the generalizability of the conclusion and needs further research.

However, both cases reveal that media-tablets are capable to create benefits that are beyond an increased mobility. The achieved convenience of the computer support leads to advantages in the value creation for the company and for the customer by improving both, the front office application and the sales forces channel in general. Concerning the front office application, the media-tablet support led to efficiency gains by decreasing media breaks and creating time savings for the customer. Additionally, the sales force channel gains benefits due to an increased productivity and advancements in information quality. Based on this conclusion, we propose an additional advantage of media-tablets besides mobile added-value, which has so far not been addressed in current research (Pitt et al. 2011b), namely the integrativeness of computer devices in conversational situations, which is based on the statement that media-tablets are better suited for use during meetings than laptop computers. Interestingly, this aspect is discussed in one of the original articles on ubiquitous computing, but has been not researched further. Besides the omnipresence of IT, ubiquity also describes the disappearance of the distraction created by the PC-era computers

(Weiser 1991). Marc Weiser formulated this as follows: “Ubiquitous computing is the method of enhancing computer use by making many computers available throughout the physical environment, but making them effectively invisible to the user. [...] the computer today is isolated and isolating from the overall situation, and fails to get out of the way of the work. In other words, rather than being a tool through which we work, and so disappears from our awareness, the computer too often remains the focus of attention” (Weiser 1993). This aspect seems to be influencing the value creation of media-tablets, but has so far been under-researched and is not even well defined. Articles dedicated to defining the characteristics and benefits of media-tablets compared to other mobile devices (Pitt et al. 2011b) also neglect this aspect. We therefore propose that future research define this aspect of the integrativeness of certain computer devices into conversational situations. A better understanding of this issue would be especially important for our understanding of all dimensions of value creation by existing and upcoming computer devices.

The study also has some managerial implications. Many corporations seem to have difficulty understanding the benefits of a media-tablet, compared to a laptop computer or a smartphone (Pitt et al. 2011b). A better understanding of this aspect of situational integrativeness would allow practitioners to identify situations and activities where the employment of media-tablets would raise value. In a first step, we therefore propose that practitioners identify situations or activities which are not computer-supported and evaluate whether a media-tablet application could fill this gap. To evaluate these situations, practitioners should not only consider the portability of the device but, also the situational integrativeness. Furthermore, we also recommend that practitioners be aware that an appropriate communication of the relative advantages of a media-tablet application to all stakeholders is an important factor for successful adoption. The results further indicate that projects, which are driven by an operating department and are based on a business case, could have an edge compared to innovation projects, which do not have a well-defined business case.

However, these recommendations are subject to several limitations. First, our research includes only two cases, which constrains the generalizability of the

findings. The recommendations are based on unvalidated hypotheses, which need to be tested in further research, as is usual in exploratory research designs. Second, the data gathered from the user survey in case Beta is potentially positively biased, as the project was triggered by the request of the sales agents, so they may have had a personal interest in indicating high satisfaction with the application. In addition, the user survey of case Beta covers only six respondents. Third, as Beta turned down the project and all employees associated with the project left the company, the information gathered in 2012 is limited and may not be complete. Due to the fact that the project is internally considered “unsuccessful”, the willingness of Beta to communicate about the project has been limited since 2012.

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Contribution C: The New Enterprise Mobility: Seizing the Opportunities and Challenges in Corporate Mobile IT

Title	The New Enterprise Mobility: Seizing the Opportunities and Challenges in Corporate Mobile IT
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Table 10: Bibliographical Information for Contribution C.

Abstract

A new generation of mobile IT is driving new thinking and innovation in most areas of organizations and is challenging corporate IT. From a “computing” perspective, this second-generation enterprise mobility (SGEM), such as smartphones and media tablets, enables pervasiveness, much more intuitive computing, and contextual intelligence. This changes what can be done with IT in enterprises and creates new challenges for IT departments. Based on three group interviews and twelve individual interviews including data from 31 corporations, we explore how corporations are responding to SGEM. Based on this data, we derive three opportunities and four challenges. The synthesis of the

results reveals that SGEM has changed employee expectations for professional IT and led to fundamental issues concerning the role and objectives of corporate IT departments. The results contribute to a more holistic picture of corporate usage of SGEM and illustrate how the new perception of IT is challenging common practice.

Keywords

Corporate IT, Mobile Computing, Opportunities and Challenges, Role of IT, Smartphone, Tablet Computer.

1 Introduction

Today, corporations face unceasing and increasingly rapid IT innovation, which challenges in particular the IT departments of large organizations. One of the currently most discussed innovations in corporate IT is mobile IT (Cearley and Claunch 2012; Frost & Sullivan 2011; Jones 2013; The Economist 2012), which encompasses all kinds of highly portable computer devices, such as tablet computer or smartphones. Starting with remarkable improvements in the hardware capabilities of these devices, mobile IT affects all layers of digital technology – including the content, service, network and device layer (Yoo et al. 2010) – by enabling various innovations and technological changes (Yoo 2010). These changes are substantial. In the content layer, mobile IT now offers more capabilities than ever for storing and consuming any kind of multimedia content. This is evidenced by 600 million mobile YouTube (2012) video views per day, or the fact that Apple is now the number 1 music retailer in the US, outpacing Wal-Mart (Galante 2012). Remarkable improvements are also evident in the service layer, as mobile IT now offers an extensive range of application functionality that serves the user for almost any propose. Facts concerning applications for mobile devices are testimony to this: For example, IDC reports that in 2010, more than 300.000 mobile applications were downloaded 10.9 billion times (IDC 2010) and Gartner forecasted that total sales for mobile applications would overtake those of business intelligence software in 2011 and enterprise resource planning (ERP) software in 2013 (Finley 2011). The network

layer, so far one of the major limitations of mobile IT, has also made remarkable improvements; wireless high-speed internet access is now available in most areas of the world and for 2011, the International Telecommunication Union reported 1.2 billion active mobile broadband subscriptions worldwide (ITU 2011). This opens up new market opportunities, as in many parts of the world – especially in emerging markets – mobile IT is often the only available technology that supports Internet access. And finally, innovation is also not stagnant on the device layer: There is a growing number of new kinds of devices which offer intuitive and mostly restriction-free access to services and content with an ever-increasing quality and functionality, coupled with decreasing prices for such devices (Harris et al. 2012; Pitt et al. 2011). These changes are evident and fundamental. In the context of corporate IT, we therefore label this new generation as second-generation enterprise mobility (SGEM), which is the focus of our study.

Such wide-reaching technological developments influence organizations (Gillespie 2007; Klein and Sorra 1996; Rogers 1995) and create a need for corporations to respond effectively to these changes and to exploit the emerging opportunities. Concerning this challenge of responding to SGEM, research can improve the adoption process of SGEM by acting as a facilitator for knowledge transfer and support practice by deriving insights from empirical studies. From an academic perspective, such issues are also valuable and contribute new insights from the latest industry practice to academic discourse. We therefore adopt an explorative research approach and examine, on a large scale, how corporations are actually reacting to SGEM by summarizing opportunities and challenges derived from industry practice. Based on three expert group interviews with CIOs, and an additional twelve interviews with C-Levels from multinational corporations, we consider the following research question related to corporate IT: What opportunities and challenges do IT departments in corporations experience with SGEM?

The remainder of the paper is organized as follows. Section 2 gives an introduction to the theory by defining SGEM. Section 3 discusses the methodological approach and describes the sample. Section 4 reports on the

results and describes the identified opportunities and challenges. Section 5 discusses the results and implications for theory and practice, as well as the limitations of the study.

2 Theoretical Background

So far, mobile IT has been defined by the distinction between portable and non-portable computer devices (Kristoffersen and Ljungberg 1999). This definition is sufficient for the first generation of mobile IT innovation witnessed in the early 2000s, but nowadays the portability of computer devices is only one aspect that sets mobile IT apart from conventional IT. The features of mobile IT now include additional aspects such as improved human-computer interaction, data visualization methods, usability and a remarkable market penetration, which offers corporations a new communication and distribution channel for products and services (Pitt et al. 2011; Stieglitz and Brockmann 2012). We use the term SGEM to refer to this new generation of mobile IT and its usage in the context of corporate IT.

To frame the research, we define SGEM by three characteristics which we derive from the theory of ubiquitous computing (Lyytinen and Yoo 2002; Weiser 1991, 1999). One aspect of ubiquitous computing is a superior usability and an intuitive human-computer interaction. This is evident for SGEM, as the intuitiveness relating to such devices has increased to a level at which even people who are generally uncomfortable with computers are able to interact with media tablets without prior training. If we compare this kind of usability and intuitive usage with PDAs or tablet computers from the early 2000s, the distinction becomes clear (Pitt et al. 2011). This increased usability enables also a better integration into the context, providing computer support in situations where computers had before been perceived as distracting and inappropriate (such as in a sales talk or counseling interview). We call this intuitive computing.

A second characteristic is the market penetration of such devices. These new devices are a market success – especially compared with their predecessors –

and have reached such a high diffusion rate that they are now pretty much available to anyone. Along with the market penetration, the portability of the devices has also increased and led to a situation where SGEM is with us anywhere, and anytime (Harris et al. 2012). These developments led to a new dimension of connectivity (Dery and MacCormick 2012), which we call pervasiveness.

Another distinction can be made in terms of the functionality of the hardware (Jonsson et al. 2010; Pitt et al. 2010). SGEM devices possess a range of sensors that enable contextual intelligence (the devices relate to their environment, like context-aware applications, automated capture or sensitive and responsive computer environments). This aspect of ubiquitous computing is frequently mentioned by various different authors (Begole 2011; Jonsson et al. 2008) and termed contextual intelligence.

By comparing these characteristics with devices that corporations recognize as the driving force of mobile IT innovation (Harris et al. 2012), namely novel smartphones, such as the iPhone or Android devices, and media tablets, such as the iPad or certain Android tablets, it can be recognized that these devices conform well to the characteristics of ubiquitous computing:

1. Intuitive computing: Mobile IT devices support an intuitive and accessible computing experience. These devices can be seamlessly integrated into a conversation and enhance, it rather than detract from it.
2. Pervasiveness: Mobile IT devices are highly portable, allow continuous connectivity – and thus a constant data and application consistency, and are available to pretty much anyone, anywhere, and anytime. This not only leads to a better reachability of existing customers, but also to the possibility to reach new customers (e.g. in emerging markets).
3. Contextual intelligence: Mobile IT devices can interact with and react to the environment, due to sensory input such as location, acceleration, light conditions, user identification and so forth.

We use these three characteristics to define SGEM. These three characteristics also set the scope of the research, as the article covers only technology that conforms to all of these three characteristics (such as smartphones and media tablets). Regarding the research question, we further need to define the terms “opportunity” and “challenge”. Opportunities refer to fields of application where the adoption of SGEM leads to a relative business advantage compared to other solutions (Porter and Millar 1985). In this process of gaining a relative business advantage due to technology adoption, the objective is to replace existing systems with a superior one. Such adoption processes are always challenging for organizations (Rogers 1995). However, regardless of whether a corporation exploits such opportunities, technological innovation is an external influence that is inevitably challenging (Gillespie 2007; Klein and Sorra 1996; Rogers 1995). We therefore define a challenge as a need for a change in approach or action, created by the emergence of SGEM.

3 Method

Our research follows a socio-materialistic approach (Leonardi 2012; Orlikowski 2009) to gain a complete view of the challenges and opportunities associated with SGEM. By following this approach, we ensure gaining a complete view and preventing a blind spot due to focusing exclusively on technology issues. Therefore, we decided to use qualitative data to capture “the voice” of the participants and conducted three expert group interviews and twelve telephone interviews. While the individual interviews followed a very structured approach, the expert group interviews were conducted as moderated roundtable discussions to foster an exchange of experiences. By combining these two approaches we ensured to capture issues that would maybe not have been revealed by a too stringent and structured approach. Concerning the participants, we invited only CIOs or officers in charge of mobility solutions as we assume that they have a complete view of the challenges and opportunities the associated organization experiences with SGEM. To have a comparable sample, the study focuses on large corporations and we therefore gathered data from 31 multinational corporations with more than one million dollars in revenue and more than three

thousand employees. All corporations in the sample are publicly traded companies from a variety of industries that operate globally. The sample includes organizations from the following industries: financial services (26 %), logistics (13 %), IT (13 %), food (13 %), heavy industry (13 %), manufacturing (10 %), electronic industry (6 %), and others (6 %). The three expert group interviews were held in 2012 and attended by CIOs from multinational corporations in Europe and the US. The interviews were moderated roundtable discussions and lasted five to six hours. For the analysis, the discussions were audio-recorded and then transcribed.

In addition, we conducted twelve interviews with CIOs or officers in charge of mobility solutions of multinational corporations from Germany, Austria and Switzerland that employ SGEM devices in different areas of their corporation. The data collection primarily comprised in-depth telephone interviews conducted in 2011 (June-December). The interviews lasted an average of about 100 minutes and were audio-recorded and transcribed. We followed a semi-structured questionnaire that covered the following areas with respect to the solutions of interest: strategic reasons, benefits of the solution, organizational issues, and strategic and technological challenges. The analysis followed the approach recommended by Miles and Huberman (1994) for qualitative content analysis. Based on the transcripts, two of the authors independently identified issues that the corporations in the sample are experiencing with SGEM. The issues had to apply to the definition of SGEM given in section 2. After collecting material on the issues, the authors independently categorized them into two categories: opportunities and challenges for corporate IT. In a series of three workshops, the authors jointly synthesized and categorized the data, yielding three opportunities and four challenges.

4 Results

In this section, we describe the opportunities and challenges identified in the course of the analysis. Empirical evidence is presented as direct quotations on a given issue. We identified three generic opportunities concerning sales, service,

and internal efficiency and four challenges for corporate IT, including the usability vs. security challenge, innovation management, software development style, and staffing.

4.1 Opportunities

In general, all organizations in our sample reported at least one benefit they experience with SGEM. In the following section, we describe three generic opportunities which we derived from our data. These opportunities are likely to apply to any industry and any organization.

4.1.1 Sales

Several corporations report that the integration of SGEM into sales activities created value for them. Common examples are media tablet solutions that introduce computer-support to face-to-face conversations. In conversations, media tablets are experienced as an appropriate device for enabling computer support, in contrast to common IT devices, such as laptops or desktop computers. One company reports that so far, they had a guideline for their field staff not to use laptop computers in interviews or talks, as they create a barrier between them and the client:

“Why tablets? We have this guideline for our consultants, which says that it is not ideal to use a laptop. If you open the laptop it creates a psychological wall between the consultant and the client” (Head of Sales, Swiss banking company).

However, computers can support such activities with additional information or the possibility to visualize different outcome scenarios. Through using media tablets, corporations can overcome these limitations and use software applications to support their staff in such activities. For example, the sales and consulting personnel of a bank uses a media tablet solution to communicate their offers to clients. These offers are complex and highly customizable financial services, which are intangible and hard to communicate to clients. Media tablets are now used during the client meetings and the service can be customized to the customer’s needs with results depicted onscreen. In addition, SGEM offers

organizations an additional communication channel. For example, the Eaton Corporation now offers resellers and end-customers a media tablet application that gives them full access to the extensive product portfolio of the company, and support for cross references for some thousand specific technical elements. Before, this was only possible for associated consulting experts. However, due to the possibility of providing enhanced users-services for SGEM, this service now is publically available. By opening up this comprehensive database to customers and making it available in a user-friendly and intuitive way, the corporation achieved additional purchases:

“Imagine a pump that goes in a John Deere tractor, or a Boeing 737. It has all kinds of configurations. [...] We search them in the app and boom! ‘This is the pump you need,’ from thousands of different types of pumps. And we’ve made it before. We make it at this plant, and the lead time is this. Here’s the engineering drawing. Here’s the data that goes with it in an e-mail. Now the customer embeds it into his system. He sees it. ‘I can use that.’ This cycle time used to take weeks, and we’ve shrunk it down to a couple of hours. We had an engineer in a design session do a product cross-reference right there, and he made a \$470,000 initial sales deal. It would have never happened without the app” (CIO, Industrial Sector – IT, Eaton Corporation).

4.1.2 Service

The pervasiveness and intuitiveness of SGEM has also led to additional customer self-service options. Due to the increased pervasiveness of SGEM, new opportunities for self-service processes are enabled. One example is the application provided by an insurance company that allows clients to report claim cases (e.g. car accidents). The client is guided through the claim report process and additional information, such as photos and location, are added to the report. The report is then submitted electronically via the application. In addition, the application provides clients with safety instructions and other useful information in accident cases. The process is digitalized and no paperwork is needed. Thus, service availability is increased and the insurance company achieves an increased information quality for the claim evaluation process. These novel self-

service options that SGEM enable are of particular interest for insurance companies:

“In 5 to 10 years, when the technology is further improved, we will have the opportunity to provide our customers with an App which will enable them to scan their home and automatically receive a customized offer.” (Director, Swiss insurance company)

Mobile applications are also employed to outsource a complete process to the customer. Airlines, for example, now provide customers with applications allowing them to search for flight offers, book flights, make mobile check-ins with seat reservation, and save the boarding pass on their mobile device. Such self-service options for clients reduce paperwork, decrease points of contact, and save time for customers, as they no longer have to queue at a counter.

4.1.3 Internal Efficiency

Pervasiveness is also capitalized in tasks that require employees to travel. Such tasks can be effectively supported and enhanced with additional information offered by SGEM devices. Standard corporate approval processes for employee requests are simpler, quicker, and more efficient. Business cases of even higher impact include advanced computer-support for activities at construction sites, for inspections of industrial facilities, for job navigation or stock-updates in rural areas. For example, media tablet usage created efficiency gains on the construction site of an airport in Qatar:

“It’s a huge open space. We put in our own Wi-Fi throughout the construction site, and launched an iPad-based inspection app for the people in the field. We measured a 3- to 5-fold gain on daily productivity for people who had the app” (CIO, Bechtel Corporation).

A comparable example can be given for the inspection of industrial facilities:

“We program operators’ routine duties into their mobile devices, including checklists for procedures. Every procedure in our complex facilities has to be done exactly right. We saw work force productivity go up by a factor of two, but

for us the greater benefit is the assurance that our procedures are done right, to make sure we don't have a catastrophic failure" (CIO, Chevron Global Upstream).

Other benefits include increased information quality about the inventory of stores in rural areas, for example the solution used by Holcim's India sales force:

"Every day they go to the dealer, and they enter into their phones how many bags of cement are there, from us and from our competitors, as well as the respective prices. The data get sent centrally for analysis. And our margin has gone up 10 percent, because we have the relevant market intelligence by knowing the development of volume and price" (CIO, Holcim).

4.2 Challenges for Corporate IT

Along with the benefits and possibilities of SGEM, corporations also experience challenges that call for new approaches to address and benefit from the emergence of this new technological generation.

4.2.1 Usability vs. Security Challenges

SGEM have reached almost everyone, regardless of demographics. This means that when SGEM devices are not supported or allowed at work, people will enjoy using them anyway in their personal lives. The convenience of applications used in private lives therefore creates expectations for professional applications. Hence, experiences with IT in personal life also form the reference point for experiences with IT in work life (Ip Kwai Fun 2010). CIOs experience this as a spill-over effect between professional and private life and perceive this as challenging:

"The trend is really coming from consumer IT—people do something at home, then they bring it to work, and they bring expectations of what it should be" (CIO, Holcim).

This conforms to the spill-over theory which predicts that experiences in personal or family life positively or negatively spill-over to work life and vice versa (Grzywacz and Marks 1999). Employees expect corporate IT applications to be as convenient as the consumer applications they use in their spare time:

“There is an expectation that it should be just as easy for people to access and use corporate information from a mobile device as it is for them in their personal lives” (CIO, Eastman Chemical Company).

But achieving comparable usability is only one aspect. Corporations often experience usability as a trade-off with security. Hence, CIOs face the challenge of balancing productivity, ease-of-use, and security:

“[...] as a corporate entity, we value our intellectual property, [...] we try to balance this dynamic between productivity and security” (CIO, Eastman Chemical Company).

The core challenge is to ensure data security and to define appropriate policies while exploiting the usability of consumer applications. IT departments therefore have to achieve both objectives: increased usability and ensured security. While several corporations report that they already integrate SGEM devices into the corporate IT infrastructure, issues remain in reconsidering existing and introducing new policies and governance models. These policies and models are needed to ensure a secure and stable operation, while adapting existing and prospective software applications to a competitive level of usability.

4.2.2 Innovation Management

These competing demands of usability and security have led to a situation where IT departments are viewed as an obstacle to innovation:

“Sometimes we were our own worst enemy, because all we started with was ‘No’ with respect to security every time anybody talked to us. They got tired of it and started finding other ways to go about it” (CIO, Bechtel).

But innovation enabled by SGEM occurs in nearly all parts of organizations. The different departments strive to employ these devices and often start projects independently from one another. Executives describe this as a quite unstructured and unorganized process with implications for long-term operability. The challenge for IT departments is to manage these projects and ensure a certain level of credibility as a facilitator for innovation:

“In talking with our customers, we find that frequently IT is not in the discussion relative to app development, mobile or social applications. These are being developed in the business units, with some third party. Often they’re coming out of the marketing department working with media firms who have gone into the IT space. What’s concerning is, ‘Are these groups taking responsibility for the operations, and ensuring that this is all going to work and be secure?’ And the answer is usually not” (VP of Strategy and Product Line Management, CompuWare).

This requires a change in how IT departments interact with the business units. The challenge for corporate IT is therefore to manage these innovation projects and bundle the efforts without slowing down the process:

“[...] we’re trying to push IT people into the business units, because when you are stuck in the back office, you can’t know everything about what the company is doing. You’ll be missing the innovation engine, which is the most important part, and which we believe will come from the business, not from IT” (CIO, Nestlé).

4.2.3 Software Development Style

To satisfy the expectations of the business units, IT departments see themselves also challenged by a new paradigm of software development. While conventional software development is very structured and organized, application development for SGEM is agile and fast. These are two different worlds of software development: the twice-a-year software upgrade release, with its lengthy and graduated testing cycles vs. the mobile applications developed within weeks and updates on-demand. This has led to a situation where

corporate IT finds itself in competition with third party software developers from the consumer application market. This challenge is, for example, manifested in the approach of some IT departments to establish a second track for software development:

“We set up our own mobile application development organization to compete with the third parties that the business units go to. We’re saying, ‘Let us be one of those. Let us compete for the same business, but on their terms, not as an IT group. If you need it in three weeks, we will have it to you in three weeks. We scrapped our old development methodologies because they’re just too big and too cumbersome and take too long” (CIO, Bechtel).

4.2.4 Staffing

Adapting to these new expectations on usability and software development cycles also creates staffing problems. The challenge is that usually the right talent is still absent within IT. This starts with the right skill-set to develop user-friendly applications:

“[To develop a] total[ly] different UI, that is totally intuitive to our employee, [...] a whole different skill-set for IT [is needed]. So you have to really take a step back and say, [...] Intuitiveness is a very important component, and the UI may not be the same on your mobile devices” (CIO, Time Warner Cable).

In addition, IT employees not only need an understanding of IT, but also of the business activities IT should support. CIOs realized this challenge and recognize that they have to redefine their role profiles:

“We hire folks that fit very well into an ERP organization. ERP is important, but it’s not what differentiates performance for us. So after looking at that, we’re hiring dual-degree people who can apply technology to the business problems we’re facing. We have a large IT organization that’s perfectly suited for the problems we’ve had over the last decade. But when you look at the problems we’re going to have in the next decade, we don’t have the skills that we need” (CIO, Chevron Global Upstream).

5 Implications and Discussion

A major limitation of the results is that they are incapable of offering conclusions on performance. The assumption of managerial recommendations (5.2) is that organizational culture influences areas of the value chain where SGEM is adopted, but not if a cultural orientation is a supporting or adverse factor of gaining business benefits from SGEM adoption. No evidence suggests SGEM performance relates to types of organizational cultures. This does not mean that such a relation does not exist, but this thesis did not examine this aspect.

Since we assume that a culturally biased decision concerning where to adopt SGEM has negative implications for the company since it misses the potential to gain business benefits through SGEM in parts of the value chain, the opposite—culturally biased decisions are beneficial to a corporation—could be also a valid assumption. Michael Watkins proposes that organizational culture “is the organization’s immune system.” Based on this assumption, unequal adoption across the value chain might prevent a company from making investments toward improving a part of the organization that is unimportant. The assumption underlying the recommendations includes that all parts of the value chain are equally important to the company. If this is not the case, unequal adoption might be beneficial if the adoption rate matches the level of importance of the area of the value chain.

These questions are the logical next steps to these results. Although results offer initial insight into the influence of organizational culture on SGEM adoption, this relationship represents the beginning of understanding this important topic. Since IT is getting increasingly involved in all areas of the organization and individuals’ daily lives, the importance of understanding associated soft factors increases throughout this development. For a successful organization, it is of the highest importance to gain new business advantages throughout employment of SGEM and IT, in general. Hence, it is important to know whether decisions influenced by organizational culture lead to beneficial or adverse implications.

This question is important at all levels of observation, including project, organization, and inter-organizational levels.

Some authors mention that organizations with a balance across various dimensions of organizational culture are more successful than organizations that focus on extremes (Leidner & Kayworth, 2006). This assumption is supported here since such organizations tend for equal adoption of SGEM across the value chain. However, this conclusion leads to the recommendation that an organization should change its organizational culture to maintain balance. This relates to intense effort, which is why the recommendation should not be offered until performance measures indicate a balanced culture is beneficial.

Concerning the challenge IT departments face (i.e., providing stability in IT operations and innovation), a balanced culture is an important target to achieve in IT departments. To me, this insight is of high value. As an information systems scholar, I am troubled by the aversion to innovation I perceive when working with IT departments. Based on the results of this thesis, I strongly recommend that IT departments must balance these extremes, or split into two organizational units with different mindsets: one for operations and one for innovation.

I am convinced that in the near future, IT's focus will shift from technological to cultural aspects. As people become increasingly comfortable with technology, their expectations will change, and IT departments will have to meet these expectations with the right mindsets and attitudes. This shift will be central for both, practitioners and scholars, and will surely lead to new and exciting challenges. I am looking forward to this and I hope that this thesis will contribute in solving these increasing challenges in corporate IT usage.

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Contribution D: Barrieren am Weg zum Mobile Contactless Payment: Eine Marktanalyse und Bestandsaufnahme der Situation in der Schweiz

Title	Barrieren am Weg zum Mobile Contactless Payment: Eine Marktanalyse und Bestandsaufnahme der Situation in der Schweiz
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Table 11: Bibliographical Information for Contribution D.

Abstract

Im Mobile Contactless Payment (MCP) wird seit Jahren die Zukunft des Bezahlprozesses gesehen. Die Diffusion dieser neuen Technologie geht jedoch langsamer voran als prognostiziert und verschiedene Länder weisen unterschiedliche Entwicklungsstufen auf. In diesem Beitrag wird eine Fallstudie der Schweiz aufgenommen, um aktuell bestehende Barrieren für die Diffusion von NFC-basierten MCP aufzuzeigen. Dabei werden die relevanten Akteure identifiziert und Tiefeninterviews durchgeführt. Die Ergebnisse zeigen, dass die

Akteure eine Wait-and-See-Strategie eingenommen haben und keine aktiven Kooperationsbemühungen bestehen.

1 Mobile Contactless Payment

Bargeldloses Bezahlen von Waren oder Dienstleistungen stellt heute grundsätzlich keine Besonderheit mehr dar. Die Funktionsweise von Debit- (Maestro) oder Kreditkarten muss ebenfalls nicht weiter erläutert werden, diese sind weit verbreitet, einsatzfähig und werden seit Jahren von Konsumenten verwendet. Die derzeit etablierten Systeme werden dennoch nicht als optimal angesehen. Bereits seit Jahren existierende Technologien ermöglichen Systeme, die nicht nur effizienter bzw. zeitsparender im Bezahlprozess sind (bottom-line growth), sondern auch Potential für einen höheren Wertbeitrag der Dienstleistung besitzen (top-line growth). Die Weiterentwicklung des bargeldlosen Bezahlers wird daher von Wissenschaft und Praxis gleichermaßen seit über einem Jahrzehnt in diversen Varianten des Mobile Contactless Payment (im Weiteren MCP) gesehen [NG07, Da08b, Sh10]. Allgemein sind unter MCP-Verfahren jegliche Zahlungsmethoden zusammengefasst, bei denen der Zahlvorgang über ein mobiles Endgerät (z.B. ein Smartphone oder Mobiltelefon) stattfindet bzw. die Zahlung durch die von mobilen Endgeräten verwendeten drahtlosen Kommunikationsstandards (z.B. wifi, UMTS oder NFC) übermittelt wird [Da08b, OP06].

Trotz der konsequenten Einschätzung des Themas als technisch umsetzbar [Go11, Ko11], zukunftssträftig [On09, Ta10, Hu08] und gewinnbringend [Fr11, Ar09, Hu08], hat sich MCP im deutschsprachigen Raum (im Weiteren auch DACH-Gebiet) bis dato nicht als Zahlungsstandard etablieren können [On09]. Pressewirksame Beispiele für MCP stammen derzeit ebenfalls nicht aus Europa, sondern aus den USA, vor allem im Zusammenhang mit der „Google Wallet“ Initiative [Go11], aus Japan, Südkorea, Singapur, wo NFC-Technologie seit Jahren erfolgreich eingesetzt wird [Da08b, AZ08], oder gar Afrika, wo MCP in Form von SMS-Payment ein nicht vorhandenes Bankensystem ersetzt [MR10, Po06b]. Eine genauere Betrachtung der Innovationsdiffusion von MCP zeigt

sogar, dass innerhalb der DACH-Region die Märkte verschiedene Entwicklungsstufen aufweisen. So wurde MCP, vor allem auf SMS basierend, in Österreich bereits für verschiedene Nischenmärkte bzw. Nischenprodukte wie Parkuhren, Tickets für den öffentlichen Verkehr oder Snack-Automaten umgesetzt [AZ08]. Am Point-of-Sale bzw. am Kassensarbeitsplatz, wo eine große Effizienzsteigerung im Bezahlprozess erwartet wird, konnte sich MCP bis jetzt jedoch nicht durchsetzen und gestartete Pilot-Projekte sind meist gescheitert [vgl. On09]. Gerade in der Schweiz, dem Land mit der weltweit höchsten iPhone-Marktdurchdringung – bereits 2010 wurde zudem ein Smartphone Marktanteil von über 40% erreicht [We11] – ist diese Tatsache erstaunlich und erfordert eine kontinuierliche Analyse. Die resultierende, diesem Beitrag zu Grunde liegende, Forschungsfrage ist demnach:

Welche Barrieren verhindern die Einführung von MCP in der Schweiz?

Die Beantwortung dieser Frage ist insofern interessant, als dass die ausführliche und kontinuierliche Analyse dieses Diffusionsprozesses wertvolle Erkenntnisse und damit Optimierungspotentiale für zukünftige und gegenwärtige, ähnliche Diffusionsprozesse erbringen kann. Die laufenden Erkenntnisse dieser Fragestellung sind somit gleichermaßen für die Praxis, den Gesetzgeber und die Wissenschaft von Interesse.

Untersuchungen und Modelle, die Barrieren in der Diffusion von MCP betrachten, wurden von [Po08a, Po08b] auf Use-Case-, von [Ch08, DÖ06, Da03, CA05, Kl04, Po03, He02, Zm04, DC05, PZ03, Le04, Ma07, Ma09] auf Technologieakzeptanz- bzw. Konsumentenakzeptanz-, von [Da08a] auf Ressourcen- und Business-Driver-, von [Da08b] auf strategischer und von [AK08, CT10, AZ08] auf ökonomischer Ebene durchgeführt.

Auf Grundlage der Modelle von [Da08b, Da08a, AK08] hat [On09] drei gescheiterte Pilotprojekte in der Schweiz analysiert und ein alle drei Modelle umfassendes, dynamisches, in Phasen aufgeteiltes Modell erstellt. Die von [On09] untersuchten Fallbeispiele scheiterten entweder an der Konsensfindung der nötigen Akteure („m-Maestro“ und „Secure Mobile Commerce – Visa“) oder an der Technologie, die keinen zusätzlichen Kundennutzen brachte (der

PostFinance Pilot 2005 in Bern basierte auf einem Matrix-Code-Scanverfahren, welches im Vergleich zu herkömmlichen Zahlungsmethoden den Bezahlprozess nicht effizienter gestaltete [Po06a]).

2011 zeichnet sich gerade, was die zur Verfügung stehenden Technologien betrifft, eine neue Situation ab. Seit 2010 werden auch für den europäischen und amerikanischen Markt vermehrt Smartphones mit Near Field Communication (NFC)-Modulen ausgeliefert und diese Technologie somit dem Konsumenten zugänglich gemacht [vgl. NF11, Ju11]. Ebenfalls ist eine Nachrüstung von NFC-Modulen über neue Subscriber-Identity-Module (SIM bzw. die SIM-Karte) oder Memory Cards möglich. Die Rahmenbedingungen für eine schnelle Verbreitung von NFC sind somit gegeben und die Technologie theoretisch bereits verfügbar.

Der Beitrag folgt damit der These anderer Untersuchungen [On09, OP08, Öz10], dass ein auf NFC-Technologie basierender Bezahlprozess den herkömmlichen Bezahlprozessen überlegen ist und die Technologie somit als Faktor bzw. potentielle Barriere ausscheidet. Die technische Umsetzbarkeit des NFC-basierten Bezahlprozesses wird ebenfalls als gegeben angesehen [Da08b, On09], insbesondere da auf Kreditkarten basierende NFC-Lösungen in der Schweiz bereits verfügbar sind [vgl. Ko11]. Demzufolge liegt der Fokus des Beitrags auf den potentiell beteiligten Akteuren und deren strategischer Ausrichtung hinsichtlich MCP. Hierzu werden die potentiell involvierten Akteure auf Grundlage des klassischen Vier-Parteien-Systems der Kreditkartenzahlung, bestehend aus Merchant, Issuer, Acquirer und dem Konsumenten [Ch03, GK03], identifiziert. Um ein auf NFC-basierendes System implementieren zu können, ist jedoch aus technischen Gründen unweigerlich der Mobilfunkanbieter als weitere Partei nötig, da für einen NFC-basierten Bezahlprozess der Zugriff auf das SIM möglich sein muss, dieses aber im Besitz des Mobilfunkanbieters ist. Daraus resultiert eine zwingende Neugestaltung des Parteiensystems für den NFC-Bezahlprozess. Somit ergibt sich eine potentielle Barriere für die Etablierung des NFC-Bezahlprozesses, die wir in folgender Hypothese (H1) festhalten und testen:

Die Umsetzung von NFC-basierten MCP wird durch die Akteure des klassischen Vier-Parteien-Modells der Kreditkartenzahlung verzögert, da diese keine Neugestaltung des bestehenden Systems unterstützen.

Für die Prüfung der postulierten Hypothese wird eine explanatorische Fallstudie durchgeführt, welche auf Tiefeninterviews mit den identifizierten Akteuren basiert. Der weitere Artikel gliedert sich wie folgt: Im nachfolgenden Kapitel werden die technischen Grundlagen für NFC-basierte MCP, die identifizierten Akteure, theoretische Grundlagen und die angewandte Forschungsmethodik der explanatorischen Fallstudienforschung nach Yin beschrieben. Kapitel drei beschreibt den Untersuchungsaufbau bzw. den Datenerhebungs- und Analyseprozess. Die erhobene Fallstudie beinhaltet die Akteure Merchant (1), Issuer (2), Acquirer (3), Netzwerkadministrator (4), Mobilfunkanbieter (5) und Trusted Service (6). Die aktuellen Positionen aller beteiligten Parteien werden hierbei mittels Tiefeninterviews erhoben und in Kapitel vier die inhaltsverdichteten Aussagen je Akteur und Erfolgsfaktor als Ergebnisse dieser Untersuchung dargelegt. Abschließend werden in Kapitel fünf die Ergebnisse interpretiert und H1 gegen die Ergebnisse getestet sowie die Einschränkungen und Limitierungen der Untersuchung diskutiert.

2 Theoretische Grundlagen und bestehende Literatur

2.1 Umsetzung von MCP per NFC

Für den Bezahlprozess per NFC ist in jedem Fall das so genannte Secure Element (SE) zwingend notwendig. Das SE beinhaltet ein digitales Zertifikat und signalisiert dem Empfangsgerät, dass die Transaktion autorisiert ist. Die Implementierung des SE kann theoretisch auf vier Arten erfolgen [Ma08, RP09]: (1) SIM-Karte / UICC: NFC-Technologie auf der SIM-Karte; (2) Memory Card: NFC-Technologie auf einer Memory Card; (3) Online Storage: Speicherung der Daten im Internet; (4) Embodied Chip: NFC-Technologie fest im Handy integriert. Die Punkte (1) und (2) repräsentieren ebenfalls die bereits

angesprochenen Möglichkeiten zur Nachrüstung von bestehender Hardware mit NFC-Modulen. Gerade die Option (1), die Nachrüstung der SIM-Karte, wird von Experten als die kostengünstige, am schnellsten zu realisierende und für den Benutzer einfachste Option erachtet [Mu10, Mü09]. Die NFC-Technologie könnte somit in Zusammenarbeit mit Mobilfunkanbietern, den Besitzern der SIM-Karten, theoretisch schon heute umgesetzt werden. Auf dieser Feststellung aufbauend argumentieren wir, dass eine Kooperation bzw. Einbindung der Mobilfunkanbieter als (neuen) Akteur unumgänglich ist. Diese Feststellung machen ebenfalls [On09] und gehen in ihrem vorgeschlagenen Modell sogar soweit, den Aufbau einer Allianz zwischen Mobilfunkanbietern und Finanzinstituten als erfolgskritischen Faktor in Phase eins zur Etablierung von MCP-Lösungen generell zu definieren.

2.2 Beschreibung der relevanten Akteure

Vom 4-Parteiensystem ausgehend können als Akteure der (1) Merchant (Point-of-Sale bspw. eine Einkaufskette), (2) Issuer (in der Regel die Geschäftsbank des Kunden), (3) Acquirer (stellt die Transaktionslösung und -Dienstleistung auf Seiten des Merchant) und (4) Netzwerkadministrator (bspw. Visa oder Mastercard) übernommen werden. Auf Grundlage der Annahme, dass der NFC-Bezahlprozess dem herkömmlichen Bezahlprozess überlegen ist (Argumentation siehe Einleitung), sehen wir die Kundenakzeptanz als gegeben und lassen diesen Teilnehmer damit in der Fallstudie unberücksichtigt. Neu hinzu kommt der (5) Mobilfunkanbieter als notwendiger Akteur. Zusätzlich zu diesen fünf Akteuren ziehen wir ebenfalls den (6) Trusted Service-Anbieter als eigenständigen Akteur in unsere Betrachtung ein. Der Trusted Service liefert bspw. die Hardware für den Zahlungsprozess am Point-of-Sale.

2.3 Identifizierung der relevanten Akteure

Bezugnehmend auf die von [CT10] beschriebenen vier grundlegenden Marktmodelle für MCP-Lösungen (siehe Abbildung 14), ist die hier diskutierte NFC-Lösung für die Schweiz im Quadranten zwei einzuordnen (im Gegensatz zu den bereits erwähnten MCP-Anwendungsfällen, bspw. Micro-Payment für

Verkehrstickets oder Parkgebühren in Österreich). Der Aufbau des kollaborativen Modells weist Ähnlichkeiten zum bestehenden 4-Parteiensystem des Kreditkartensystems auf. Dabei sind drei Faktoren zu beachten: (1) Die Fachkompetenz der nötigen Akteure für ein funktionierendes auf NFC-basierenden Bezahlsystems sind sehr nahe an den Kompetenzen der Akteure im Kreditkartenbezahlsystem; (2) Die für ein NFC-Bezahlsystem notwendige Infrastruktur (Lesegeräte am Point-of-Sale mit Internet- und Kassensystemanbindung) ist sehr ähnlich zur Infrastruktur des Kreditkartensystems; (3) Das NFC-Bezahlsystem ist ein Konkurrenzsystem zum Kreditkartensystem und löst längerfristig eine Marktverdrängung als überlegenes Substitut-Produkt aus.

Auf Grund der Zusammenhänge des Kreditkartenbezahlsystems und einer NFC-basierten MCP-Lösung ist die Einführung eines solchen neuen Systems für alle am Kreditkartenbezahlsystem teilnehmenden Akteure und die Mobilfunkanbieter relevant bzw. müssen diese Akteure im Implementierungsprozess beachtet werden.

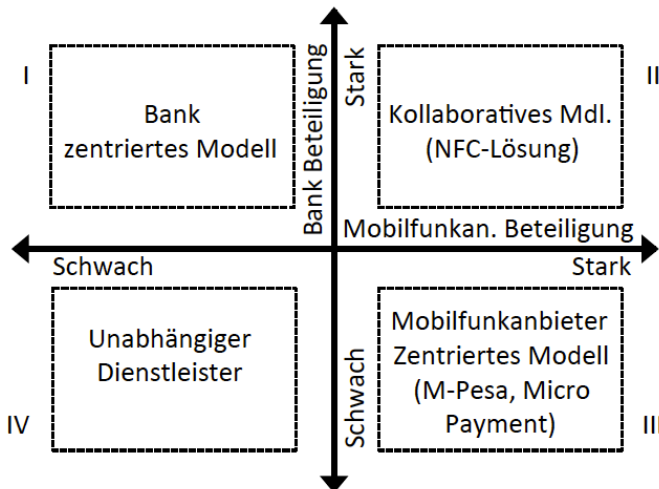


Abbildung 14: Vier grundlegende Ausprägungen von Marktmodellen für MCP [vgl. CT10].

2.4 Research-Framework

Wie in der Einleitung erwähnt, existieren bereits diverse Modelle, die einen Erklärungsbeitrag zum Verlauf des Diffusionsprozesses von MCP-Lösungen liefern. Das umfangreiche und für die Situation in der Schweiz gut geeignete Modell (es wurde bereits auf drei Schweizer Fallbeispiele angewandt) von [On09] stellt die Basis dieser Untersuchung. Das Modell integriert die Modelle von [AK08, Da08b, Da08a] und umfasst sie mit einem Vier-Phasen-Modell, um den dynamischen Charakter der Diffusion darzustellen und die genannten Faktoren in eine zeitliche Abfolge zu bringen. Phase eins betrifft den ersten Schritt, das Aufbauen einer Allianz zwischen Mobilfunkanbieter und Finanzdienstleister. Mit Phase zwei wird der Aufbau der nötigen Strukturen auf Kunden- und Merchant-Seite betrachtet. In Phase drei wird die Lösung so umgesetzt, dass ein höherer Wertbeitrag für den Kunden entsteht und ihm kommuniziert wird. Technologische Aspekte, wie bspw. einfache Bedienbarkeit der Lösung, Skaleneffekte und Kompatibilität mit anderen Standards, werden in Phase vier behandelt. Alle vier Phasen werden dabei von einer fünften, zeitlich alle Phasen umfassende, umklammert, welche die übergeordneten rechtlichen bzw. regulierenden Aspekte beinhaltet. Da sowohl der Kunde wie auch die technologischen Aspekte aus unserer Betrachtung ausgenommen sind und auch die rechtlichen Rahmenbedingungen nicht weiter untersucht werden sollen, werden die Phasen eins und zwei für unsere Betrachtung übernommen. Somit ergeben sich acht Erfolgsfaktoren, welche die Grundlage der zu erhebenden Fallstudie darstellen. Tabelle 12 enthält eine Zusammenfassung der relevanten Erfolgsfaktoren. Die Faktoren (1), (4), (5), (6), (7) und (8) leisten dabei einen direkten Beitrag zur Untersuchung von H1. Die Untersuchung aller Faktoren stellt letztlich die Grundlage zur Beantwortung der Forschungsfrage.

	Au und Kauffmann [AK08]	Dahlberg 1 [Da08b]	Dahlberg 2 [Da08a]
Phase 1, Allianz zwischen Mobilfunk- anbieter und Finanz- dienstleister	(1) Stakeholder identifizieren	(4) Wettbewerb zwischen den Anbietern (5) Neues und konkurrierende Systeme	(7) Schlüsselakteure am Markt
Phase 2, Aufbau von Strukturen auf Kunden- und Merchant-Seite	(2) Netzwerk- externalitäten (3) Kosten- reduktion	(6) Einfluss des Merchant	(8) Ökonomische und betriebswirt. Faktoren (7) Schlüsselakteure

Tabelle 12: Erfolgsfaktoren zur Etablierung einer MCP-Lösung [vgl. On09].

Da bis auf Faktor (2) die anderen Faktoren selbsterklärend sind, soll Faktor (2) noch kurz beschrieben werden. Der Erfolgsfaktor „Netzwerkexternalitäten“ bezieht sich auf die Theorie der zweiseitigen Märkte. Die Dienstleistung des Bezahlprozesses wird dabei an zwei Kundengruppen (Märkten) angeboten, dem Merchant und dem Konsumenten. Das Verhalten auf dem einen Markt hat dabei indirekt Einfluss auf den anderen Markt. Bieten bspw. wenige Merchants eine Bezahlungsmöglichkeit per NFC an, wird die Nachfrage nach NFC-Bezahlung auch auf der Konsumentenseite gering sein.

2.5 Forschungsmethode Fallstudienforschung

Fallstudienforschung kann helfen, komplexe Phänomene zu verstehen, wenn es für das Verständnis keine isolierte, sondern eine ganzheitliche und in den Kontext eingebettete Betrachtung bedarf [Be87, Bo85, Yi03]. Wie aufgezeigt, kann das Phänomen „Fehlendes MCP in der Schweiz“ nicht bezüglich eines

Marktteilnehmers, sondern nur im Kontext des gesamten Marktes untersucht werden. Wie in der Fallstudienforschung üblich, sind Grenzen zwischen Phänomen und Kontext nicht stringent scharf abgrenzbar. [Ko06] verweist darauf, dass es sich bei einer Fallstudie eigentlich nicht um eine Methode handelt, sondern mehr um eine Forschungsstrategie, die auf quantitativen und qualitativen Methoden-Elementen aufbaut. Die hier beschriebene Fallstudie ist von explanatorischem Typ, denn sie versucht, die in den Kapiteln 2.2 bis 2.4 beschriebene, bestehende Theorie zu prüfen [vgl. Yi03]. Die nach [Yi03] empfohlene Methode, bestehende Theorie zu falsifizieren oder zu verifizieren, ist der Muster-Abgleich. Diesem liegt die Idee zu Grunde, dass falls in der Definition der Forschungsfrage bzw. des Untersuchungsobjekts Gebrauch von bestehender Theorie gemacht wurde, diese theoretischen Aussagen ebenfalls die Struktur der Untersuchung definieren [Sa09]. Das wurde wie in Kapitel 2.4 umgesetzt. Bei der Erhebung der Fallstudien stützen wir uns daher auf das in Kapitel zwei aufgezeigte, erweiterte Parteien-Modell des MCP und führen, wie in [Yi03, Sa09] empfohlen, Tiefeninterviews mit jeder einzelnen Partei durch. Kapitel 3 verdeutlicht diesen Untersuchungsaufbau.

3 Untersuchungsaufbau

3.1 Datenerhebung

Zur Datenerhebung wurde je identifizierten Akteur mindestens ein repräsentatives Unternehmen ausgewählt und mit den Entscheidungsträgern ein Tiefeninterview geführt.

(1) Merchant: Der Detailhandel in der Schweiz ist durch ein Duopol geprägt [We08]. Wir gehen davon aus, dass bereits eines der marktbeherrschenden Unternehmen repräsentativ für den Detailhandel ist.

(2) Issuer: Der Marktanteil von Swisscard, UBS, Corner Banca SA und Viseca beträgt über 80% und teilt sich in etwa gleichmäßig auf [Wi10]. Der befragte Marktteilnehmer besitzt einen Marktanteil von rund 23% am Gesamtmarkt und wird daher als repräsentativ erachtet.

(3) Acquirer: Die führenden Anbieter SIX-Multipay und ADUNO besitzen zusammen einen Marktanteil von 92%, daher wurde ein Interview mit einem dieser Unternehmen durchgeführt.

(4) Mobilfunkanbieter: Der Markt ist unter den Anbietern Swisscom, Orange und Sunrise dreigeteilt. Das befragte Unternehmen weist einen Marktanteil von etwa 60% am Mobilfunkmarkt auf [NZZ09] und wird daher als repräsentativ erachtet.

(5) Netzwerkadministratoren: Auch in diesem Markt herrscht ein Duopol zwischen MasterCard und Visa [NZZ06]. Beide Unternehmen wurden befragt.

(6) Trusted Service Manager: Für den Trusted Service Manager gibt es für die Schweiz zwei potentiell in Frage kommende Unternehmen, die über die nötige Kompetenz verfügen [Mu10]. Eines der Unternehmen wurde in die Befragung aufgenommen.

Insgesamt wurden mit Entscheidungsträgern (Geschäftsführung oder, falls vorhanden, Leiter der entsprechenden Abteilung für Payment-Solutions) aus sieben Unternehmen Tiefeninterviews durchgeführt. Die Stichprobe wird auf Grund der teilweise marktbeherrschenden Stellung der befragten Unternehmen als repräsentativ für den Schweizer Markt erachtet. Für die Interviews wurde ein semistrukturierter Interviewleitfaden nach den Grundsätzen von [MN05] konzipiert. Er gliedert sich in die drei Abschnitte: Einstieg (Status Quo), Hauptteil (Barrieren, Vorteile, Hindernisse) und Abschluss (Ausblick). Die Leitfragen wurden auf die in Tabelle 1 beschriebenen Erfolgsfaktoren angepasst. Die Interviews wurden 2011 persönlich bei den Unternehmen durchgeführt und als Audioaufnahmen aufgezeichnet. Die durchschnittliche Interviewdauer betrug ca. 75 Minuten. Als Grundlage für die Analyse wurden die Audioaufnahmen transkribiert.

3.2 Analyse

Die Auswertung der qualitativen Inhaltsanalyse kann anhand einer Zusammenfassung, einer Explikation oder einer Strukturierung erfolgen [Ma10]. Um einen Überblick zu Barrieren für MCP zu erhalten, ist eine Gesamtsicht

über alle Interviews erforderlich. Die Zusammenfassung wurde daher als passende Analyseverfahren gewählt. Die Interviewanalyse erfolgte nach dem Ablaufmodell von [Ma10] in folgenden Schritten: (1) Paraphrasierung, (2) Generalisierung, (3) erste Reduktion, (4) zweite Reduktion. Über das Reduktionsverfahren wurde auf Grundlage der acht Faktoren von [On09] ein Kodierungsschema abgeleitet und die Aussage zu den einzelnen Faktoren extrahiert. Die Ergebnisse des Reduktionsverfahrens und der Kodierung wurden von einem zweiten Kodierer überprüft und einer Plausibilitätskontrolle unterzogen, um die Interrater-Reliabilität sicher zu stellen.

Faktoren	Positiv	Negativ
(1) Stakeholder identifiziert	Ja	Nein (Rolleneinteilung fehlt; Business Case fehlt)
(2) Netzwerk-externalitäten	Interesse von Merchant / Konsument / beiden	Kein Interesse von Merchant / Konsument / beiden; Interesse unklar
(3) Kostenreduktion	Ja	Nein
(4) Wettbewerb zwischen den Anbietern		Kommunikation fehlt (Misstrauen der Marktteilnehmer; Unverständnis zwischen den Akteuren; "Lack of Cooperation"); Protektionismus (Ertragsströme sichern; eigene Interessen zentral)
(5) Vergleich neues und konkurrierende Systeme	Vorteil (Zusatzdienstleistungen; schnellere Bezahlung)	Vorteil unklar
(6) Einfluss des Merchant	Hoch; Passive Haltung (Abwarten der Akteure; 4-P-System erhalten)	
(7) Schlüsselakteure	Merchant (Investitionszyklus des Merchant maßgeblich); Konsument; Politik (Förderprogramme)	
(8) Ökonomische und betriebswirt. Faktoren	Ja (Added Value; Zusatzservices möglich; neue Einnahmen; günstigere Terminals)	Nein (Keine neuen Verdienstmöglichkeiten gegeben)

Tabelle 13: Kodierungsschema auf Grundlage der acht Faktoren nach [On09] und Aussagen der Interviews.

Tabelle 13 enthält das Kodierungsschema. Die Klammern enthalten Aussagen, die zu einer Ausprägung zusammengefasst wurden. Die Faktoren (1) bis (5) und (8) wurden jeweils in positive bzw. negative Ausprägungen unterteilt, die Faktoren (6) und (7) sind als neutral zu betrachten.

4 Resultate

In diesem Kapitel werden die Ergebnisse der Fallstudie bzw. der einzelnen Tiefeninterviews dargestellt. Wie in Kapitel 3 beschrieben, wurde eine qualitative Inhaltsanalyse bzw. Inhaltsverdichtung nach [Ma10] durchgeführt. Die nach Tabelle 13 entsprechend kodierten Ergebnisse je Erfolgsfaktor und Akteur (siehe Kapitel 2.2) sind in der folgenden Tabelle 14 dargestellt. Positive Aussagen der Befragten bezüglich der Erfolgsfaktoren sind mit (+) gekennzeichnet, negative mit (-).

Faktor	(1) Merchant	(2) Issuer	(3) Acquirer
(1) Stakeholder ident.	(-) Nein	(-) Nein	(-) Nein
(2) Netzwerk-externalitäten	(+) Interesse Merch.	(-) Kein Interesse Konsument	
(3) Kostenreduktion	(+) Ja	(-) Nein	(-) Nein
(4) Wettbewerb zwischen den Anbietern	(-) Kommunikation fehlt	(-) Protektionismus	(-) Protektionismus
(5) Vergleich neues und konkurrierende Systeme	(+) Vorteil	(-) Vorteil unklar	(-) Vorteil unklar
(6) Einfluss des Merch.			
(7) Schlüsselakteure	Konsument	Passive Haltung	Passive Haltung
(8) Ökonomische und betriebswirt. Faktoren	(+) Ja	(-) Nein	(-) Nein

Fortsetzung der Tabelle

Faktor	(4) Netzwerkadmin	(5) Mobilfunkanb.	(6) Trusted Service
(1) Stakeholder ident.	(-) Nein	(-) Nein	(-) Nein
(2) Netzwerk- externalitäten	(-) Unklar	(-) Unklar	(-) Unklar
(3) Kostenreduktion	(+) Ja		(+) Ja
(4) Wettbewerb zwischen den Anbietern	(-) Protektionismus		(-) Protektionismus
(5) Vergleich neues und konkurrierende Systeme	(+) Vorteil	(-) Vorteil unklar	(+) Vorteil
(6) Einfluss des Merch.	Hoch	Hoch	Hoch
(7) Schlüsselakteure	Merch.; Politik	Merch.; Konsument	Merch.; Konsument
(8) Ökonomische und betriebswirt. Faktoren	(+) Ja	(+) Ja	(+) Ja

Tabelle 14: Inhaltsverdichtete, kodierte Ergebnisse pro Erfolgsfaktor je Akteur.

5 Interpretation und Diskussion

Die ersten Initiativen für MCP-Lösungen gingen in der Schweiz von der PostFinance aus, welche generell eine First-Mover-, bzw. Technologieführerschafts-Rolle in der Schweiz einnimmt [On09]. Das PostFinance Pilotprojekt in Bern 2005 hat besonders im Vergleich zu den anderen zwei MCP-Initiativen (siehe Einleitung) klargestellt, dass ein Akteur mit entsprechender Positionierung den Innovationstreiber stellen muss, um die nötigen Strukturen und Rahmenbedingungen zu schaffen. Der Pilot der PostFinance ist primär an der Technologie gescheitert. 2011, wo eine

entsprechende Technologie mittels NFC erweiterter SIM-Karten existiert, bestehen die primären Barrieren zum einen im fehlenden Innovationstreiber und dem Missverständnis unter den relevanten Akteuren. So konnte die Identifizierung der relevanten Akteure bzw. Stakeholder als Barriere erkannt werden (vgl. Tabelle 3). Die Zusammenstellung bzw. die Rollenverteilung in einem neuen System ist für keinen der Akteure klar. Das so argumentierbare Kommunikationsproblem zwischen den Akteuren zeigt sich ebenfalls im Missverständnis die Nachfrage betreffend (Faktor 2). Zeigt der Merchant Interesse an MCP bzw. besonders an den damit verbundenen Zusatzleistungen, die dem Konsumenten geboten werden können, und erwartet zudem eine Kostenreduktion durch die Prozessoptimierung im Bezahlvorgang, so gehen die anderen Akteure davon aus, dass keine Nachfrage für MCP seitens des Merchant und des Konsumenten besteht. Dieses Missverständnis ist ebenfalls im Bereich der Technologieeinschätzung zu erkennen. Wird vom Merchant die neue Technologie durchwegs als positiv und vorteilhaft bewertet, ergibt sich bei den anderen Akteuren ein widersprüchliches Bild. Diesen Barrieren, die fehlende Rollenverteilung und das Missverständnis zwischen den Akteuren, kann ein Zusammenhang zu den Ergebnissen bezüglich Faktor 4 unterstellt werden. Der Wettbewerb zwischen den Anbietern (4) wird von allen Akteuren als durchwegs negativ beschrieben. Die Interviewteilnehmer sprechen von fehlenden Kooperationen, Misstrauen zwischen den Akteuren und protektionistischen Haltungen der Teilnehmer (unsere Ertragsströme müssen erhalten bleiben; es dürfen keine neuen Akteure zum Vier-Parteien-System hinzukommen). Wie im Zusammenhang mit H1 argumentiert, ist eine Neugestaltung des Marktes bzw. des Systems ein notwendiger Schritt für die Einführung von NFC-basiertem MCP. Generell konnte in den Interviews festgestellt werden, dass die Akteure auf mittlere Frist alle davon ausgehen, dass das bestehende Kreditkartenbezahlsystem durch eine kommende technologische Neuerung verändert bzw. abgelöst wird. Somit erklärt sich das Anliegen der Akteure (2), (3), (4) und (6), ihre Ertragsströme zu schützen bzw. nicht ihre Geschäftsgrundlage zu verlieren. Die aus dieser Einschätzung resultierende generell defensive Haltung der Akteure ist eine Erklärung für die erkennbare,

und in den Interviews beschriebene, eingenommene Wait-and-See-Strategie der Akteure.

Somit kann H1 teilweise bestätigt werden. Die Barriere in Form der Gestaltung des neuen Akteur-Systems konnte in der Fallstudie gezeigt werden. Das Misstrauen bzw. die Barriere konzentriert sich jedoch nicht wie angenommen auf den neuen notwendigen Akteur, sondern generell gegen die Neugestaltung des Systems.

Aus anderen Fallbeispielen ist bekannt [AK08], dass erfolgreiche Einführung von MCP meist über Allianzen zwischen Mobilfunkanbietern und Finanzdienstleister initiiert werden. Auch [On09] sehen diesen Schritt als essentiell und definieren ihn als Phase 1 in ihrem Modell. Die Ergebnisse zeigen jedoch, dass weder der Mobilfunkanbieter noch Issuer oder Acquirer die Technologie und die Nachfrage als positiv einschätzen. Im Gegensatz dazu wird die Technologie vom Merchant als durchwegs positiv und interessant eingeschätzt, eine Umsetzung im nächsten Investitionszyklus der Bezahlerterminal ist damit als wahrscheinlich zu erachten. Im internationalen Vergleich konnten [AK08] ebenfalls feststellen, dass die Etablierung von technisch ähnlichen Lösungen, wie mobile Ticketing, die Nachfrage und Akzeptanz auf Konsumentenseite generell für MCP erhöht. Durch die vermehrte Verbreitung von mobile Ticketing in der Schweiz (sowohl der führende Personentransportanbieter SBB als auch die führenden Fluglinien wie SWISS und Lufthansa bieten bereits mobile Ticketing über mobile Apps an) ist eine positive Entwicklung für MCP auf Konsumentenseite wahrscheinlich. Sollte sich somit die Einschätzung des Mobilfunkanbieters gegenüber NFC-basiertem MCP ändern, kann von einer raschen Implementierung ausgegangen werden.

Für die Akteure (2) bis (6) ergeben sich potentiell interessante Verdienstmöglichkeiten in einem neuen auf MCP ausgelegten Bezahlungssystem. Da kein generelles Verständnis über die Rollenverteilung in einem solchen System besteht, existieren im Moment Gestaltungsmöglichkeiten für alle Akteure. Diese noch offenen Gestaltungsmöglichkeiten können vorteilhaft genutzt werden. Dazu muss jedoch die eingenommene Wait-and-See-Strategie beendet werden. Als Handlungsempfehlung für die Akteure (2) bis (6) kann abgeleitet werden,

eine aktivere bzw. gestaltende Strategie zu forcieren. Dies kann bspw. über die Etablierung eines Round-Table für MCP geschehen. Der koordinierende Akteur kann damit seine Verhandlungsposition verbessern und sich eine maßgebende Rolle in einem zukünftigen Gestaltungsprozess erarbeiten. Das Risiko, an einem zukünftigen System nicht teilzunehmen bzw. Ertragsströme zu verlieren, kann ebenfalls verringert werden.

Im Gegensatz zu den von [On09] beschriebenen Fällen, die frühe Initiativen beschreiben, welche an der Konsensfindung der Akteure bzw. der Technologie gescheitert sind, kann zum aktuellen Zeitpunkt keine Initiative zur Einführung von MCP in der Schweiz erkannt werden. Sind die beschriebenen technologischen Schwierigkeiten durch die Entwicklung seit 2005 weitgehend überwunden, bestehen noch immer Probleme in der Bildung von Kooperationen zwischen den notwendigen Unternehmen. Als Konsequenz daraus ergeben sich vier Zukunftsszenarien:

- (1) Einer der beschriebenen Akteure übernimmt eine führende Rolle, um ein entsprechendes System zu bilden.
- (2) Ein neuer Akteur (bspw. wie in den USA Google mit der Google Wallet Initiative [Go11]) übernimmt eine führende Rolle zur Bildung eines entsprechenden Systems.
- (3) Die Politik sorgt für entsprechende Rahmenbedingungen bzw. die Rollenvergabe evtl. in Kombination mit Förderungen. [On09] sehen diese Variante in Phase 5, welche alle vier Phasen umklammert, gegeben.
- (4) Die Variante eines NFC-basiertem MCP wird durch eine neue Technologie abgelöst.

Eine Einschätzung der Varianten ist im Rahmen dieses Beitrags nicht möglich, dennoch kann das Eintreten des neuen Akteurs Google am US-amerikanischen Markt auch international als einflussreiche Entwicklung gesehen werden, die durch hohe Investitionsvolumen und starkem medialem Interesse neue Dynamik in die Entwicklung von NFC-basiertem MCP bringt. Auch aktuelle Initiativen in der Schweiz, wie die Einführung des kontaktlosen Bezahls per

Kreditkarte [Ko11], können als neue Impulse für die zukünftige Entwicklung gesehen werden.

Aus wissenschaftlicher Perspektive ergeben sich weitere Untersuchungsmöglichkeiten zum Aufbau bzw. zur Ablöse von existierenden großtechnischen Systemen. Die Entwicklungen im MCP bieten die Möglichkeit, die Entwicklung von Produkten und Dienstleistungen, die das Zusammenwirken verschiedener Akteure benötigen, zu untersuchen. Neben der qualitativen Betrachtung über die Aufnahme von Fallstudien können ebenfalls Simulationen, bspw. als agentenbasierte Modelle, wertvolle Erkenntnisse für die ganzheitliche Betrachtung solcher Entwicklungen liefern bzw. zur Überprüfung von aus Fallstudien abgeleiteten Erkenntnissen dienen.

Abschließend sollen die Limitierungen der Untersuchung diskutiert werden. Der Entscheidungsprozess im Bezug auf MCP konzentriert sich in der Schweiz auf eine überschaubare Anzahl an Unternehmen. Für jeden Akteur wurde mindestens ein für den Markt repräsentatives Unternehmen in die Untersuchung aufgenommen. Limitierungen bestehen dennoch im Bereich der Merchants, da dieser Akteur eine breite Gruppe an unterschiedlichen Unternehmen umfasst. Um die Interpretation weiter zu stützen, dass ein Missverständnis über die Nachfrage nach MCP zwischen Merchant und den Anbietern besteht, kann eine ausgeweitete Interviewserie mit mehreren für den Akteur Merchant repräsentativen Unternehmen durchgeführt werden. Um ein fundiertes Verständnis zu erlangen, sind weitere Interviewserien notwendig, die die Entwicklung dokumentieren.

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Contribution E: Why is there Variation in the Nature of Organizational Mobile IT Adoption? An Empirical Study of the Influence of Organizational Culture on Organizational Mobile IT Adoption

Title	Why is there Variation in the Nature of Organizational Mobile IT Adoption? An Empirical Study of the Influence of Organizational Culture on Organizational Mobile IT Adoption
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Table 15: Bibliographical Information for Contribution D.

Abstract

This study investigates how organizational culture (OC) influences the adoption of mobile IT in organizations. So far, research has only considered control or flexibility-oriented OC as an influencing factor in mobile IT adoption. We use the competing values model of Denison and Spreitzer to extend the existing theory and assess whether an external or internally-orientated OC influences mobile IT adoption in organizations. Based on a quantitative questionnaire, we collected data from CEOs, CIOs, and managers from 101 organizations.

Employing PLS, the relationships of two culture types - group culture (GC) and developmental culture (DC) - and their influence on mobile IT adoption in customer relations, supplier relations, and production and operations is tested. The results show that GC and DC influences mobile IT adoption differently. GC has a positive influence on mobile IT adoption in production and operations and DC on mobile IT adoption in customer relations. Hence, the study indicates that mobile IT adoption is subject to cultural bias. The findings can support executives by creating an awareness of culturally-biased adoption. We contribute new insights into the understanding of mobile IT adoption and extend the existing theory concerning the influence of OC on organizational mobile IT adoption.

Keywords

IT Adoption, Mobile IT, Mobile Computing, Organizational Culture, CVM, PLS.

1 Introduction

Over the last few decades, information technology (IT) has emerged as a critical resource enabling organizations to create value and has led to the transformation of products, processes, companies, industries, and even competition itself. The painful structural shifts experienced by the music, film and publishing industries are testament to the transformative force of IT innovation (The Economist, 2012). Following this tradition, mobile IT has emerged as another transformative force with the capabilities to reshape business and society (Time Magazine, 2012). The potential business value of mobile IT is almost beyond question and scholars and practitioners confirm that it has the potential to leverage business value gains across the entire value chain of organizations (Barnes, 2004; Kadyte, 2004; Basole, 2005; Sheng et al., 2005; Walker and Barnes, 2005; Scornavacca and Barnes, 2008; Sørensen, 2011). However, the business value of mobile IT is multi-faceted, as demonstrated by Scornavacca and Barnes (2008), who summarize eight core and non-mutually exclusive benefits of mobile IT, including business transformation, efficiency,

effectiveness, flexibility, etc. However, despite the claimed benefits of mobile IT, in practice, we recognize different patterns and states of adoption. Concerning the adoption of mobile IT in organizations, many have recently started to develop their first customized software applications for smartphones or tablet computers, while at the same time, other organizations have been using comparable solutions for several years. For example, many organizations are now adopting applications to support their sales staff with media tablets whereas other organizations have been using tablet computers for comparable applications since the early 2000s (Walker and Barnes, 2005). Similar observations can be made about the adoption of PDAs (personal digital assistant) or smartphones. Therefore, questions arise about factors that explain differences in the adoption of mobile IT among organizations. To better understand these factors, it is necessary to study the organizational context in which the adoption of mobile IT takes place. We, therefore, focus on organizational behavior and adoption, rather than on individual behavior or adoption.

On an organizational scale, research has so far focused mostly on the strategic implications and competitive advantages of mobile IT to explain adoption behavior (Ladd et al., 2010). However, some authors (Che and Nath, 2005; Chen and Corritore, 2008; Chen and Nath, 2008; Hoang et al., 2008) consider that besides national culture (Sgriecia et al., 2007), an appropriate organizational culture (OC) is also a pivotal factor that influences organizational IT adoption. For example, Chen and Nath (2008) conclude that the extent to which organizations supported mobile workers depends largely upon the culture of the organization and its employees. They state that organizations need to consider whether they are comfortable with employees not being physically in a space eight hours a day, 40 hours a week. They conclude that organizations, in which employees are viewed as capable, motivated, and trustworthy, are more open to mobile IT. At the other extreme, in more “control-focused” organizations, mobile work initiatives are not supported by management and employees tend to resist new technologies and change in the workplace. Chen and Nath (2008) conclude that nearly all CIOs in their sample noted that the right OC and work

environment are the keys to success in mobile work. Based on these results, Chen and Corritore (2008) developed a theoretical model of a nomadic culture, which proposes that control-focused organizations will disfavor mobile IT and flexibility-oriented organizations will favor mobile IT. In addition to mobile work, Hoang et al. (2008) also make a comparable conclusion on telecommuting. They observed that telecommuting has been highly touted for a number of years, but its adoption indicates varying levels of success. They propose reinvestigating the impact of OC on telecommuting adoption.

On the one hand, these results support the assumption that OC is related to the adoption of mobile IT, but on the other hand, it is also a very limited conclusion, as only one dimension of OC (control vs. flexibility-focused) is taken into consideration. In addition, mobile work and telecommuting are only two aspects of mobile IT adoption and neither article further explores the impact of OC in particular. In conclusion, research indicates that OC is an important factor influencing organizational mobile IT adoption, but specific empirical work on this aspect still needs to be conducted. However, the observation that mobile IT adoption is characterized by varying levels of adoption can be further confirmed by preliminary research on the sub-aspect of telecommuting and mobile work. Additionally, we conclude that research which considers OC as an influencing factor for, in particular, mobile IT adoption, contributes to the existing body of knowledge and enriches our understanding of mobile IT adoption in organizations. We therefore state the following research question:

How does organizational culture influence the organizational adoption of mobile IT?

In this article, we present an empirical study and extend the existing knowledge by examining the influence of OC on the adoption of mobile IT in organizations through exploring in particular, the cultural dimension of internal vs. externally-focused OCs. The study thus contributes to a more detailed understanding of the nature of this evolving technology in the context of organizational usage and tests for cultural bias in the adoption process.

The remainder of the paper is organized as follows. Section 2 contains an introduction on related work and the theory, and defines the hypotheses. Section 3 discusses the methodological approach and sample. Section 4 reports on the results and section 5 discusses the results and their implications for theory and practice, as well as the limitations of the study and opportunities for further research.

2 Theoretical Framework and Hypotheses

From a theoretical point of view, we examine the relationship between two constructs: OC and mobile IT adoption. However, to use OC as a theoretical construct, different cultural types have to be identified and operationalized. The same applies to mobile IT adoption. In the following section, we define both constructs and develop hypotheses that specify their relationship.

2.1 Organizational Culture

Culture theory in general has been used to explain a wide range of social behaviors and outcomes in organizational settings. The preliminary findings provide reasonably compelling evidence that value orientations (from a cultural perspective) may predispose certain social groups / organizations to either favor or disfavor the adoption of certain IT artifacts (Leidner and Kayworth, 2006). It is also proposed that OC influences managers' choices of desired outcomes and decisions on the means to achieving these outcomes (Yarbrough et al., 2011). Thus, the OC theory suggests that OC impacts on perceptions of whether mobile IT is a good or bad thing. Concerning culture at an organizational level, the concept of organizational climate must also be mentioned as a comparable approach. Both concepts share comparable assumptions and definitions and have been traditionally distinguished by the research approach – culture was qualitatively, climate quantitatively measured – but with the emergence of quantitative measures for culture, many authors argue that the two concepts have become indistinguishable (Jung et al., 2009; Thumin and Thumin, 2011).

We follow the recommendation of Thumin and Thumin (2011) and use the term culture, as it is more encompassing than climate.

One of the most common instruments, which has been widely reported and proven valid, is the competing values model (CVM). It is a value-based and dimensional approach introduced by Denison and Spreitzer (1991) that is capable of distinguishing and measuring different cultural types. In information systems research, it is widely used to empirically assess culture on an organizational scale (Leidner and Kayworth, 2006). In general, the CVM is a meta-theory that was originally developed to explain differences in the values underlying several organizational effectiveness models (Quinn and Rohrbaugh, 1981; Denison and Spreitzer, 1991). Culture is measured in terms of values separated by two distinctions and dimensions, namely: control vs. flexibility and internal vs. external focus (Denison and Spreitzer, 1991; Iivari and Huisman, 2007). Figure 1 illustrates the two main dimensions on which the CVM is based: the control-flexibility axis (vertical) and the internal-external axis (horizontal). The control-flexibility axis reflects the extent to which an organization emphasizes control and stability, as opposed to flexibility and spontaneity. The internal-external axis reflects whether an organization emphasizes its internal organization or the environment. Organizations with an internal-focus strive to maintain and improve the existing organization, while externally-oriented organizations focus on competing with, adapting to, and interacting with the external environment (Zu et al., 2010). By combining the two axes, four types of ideal cultural orientations emerge from this distinction: group culture (GC), developmental culture (DC), rational culture (RC), and hierarchical culture (HC). These four cultural orientations are defined differently and can be distinguished from one another and measured independently. Figure 15 illustrates the CVM, including the two axes and four cultural types.

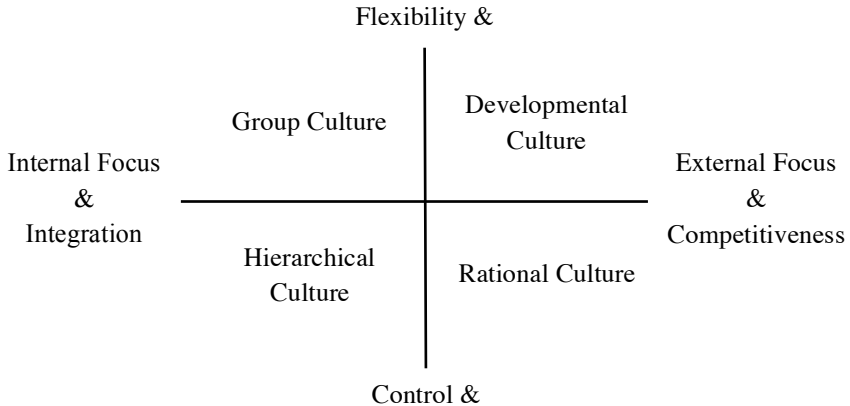


Figure 15: The Competing Values Model (Denison and Spreitzer, 1991; Zu et al., 2010).

By applying the CVM, it is possible to extend the existing theory on nomadic culture, which focuses mainly on the control-flexibility axis, with a novel aspect introduced by the internal-external axis. As the theory of nomadic culture proposes that a control-oriented culture deemphasizes mobile IT adoption, we focus on cultural types that emphasize mobile IT adoption. This decision is based on two reasons. First, based on the preliminary results, we assume that these two cultural types display higher adoption rates and are therefore more likely to reveal differences in mobile IT adoption across the value chain. Second, by limiting our view on two types, the research design is more focused and includes a manageable number of hypotheses. Based on these reasons, we research the flexibility and spontaneity-oriented cultural types (the upper two types in Figure 1): GC and DC. The difference in mobile IT adoption of these two cultural types reveals, whether the internal-external axis influences mobile IT adoption. Following this approach, we can examine the relationships between two culture types and mobile IT adoption in organizations (Zu et al., 2010). To formulate hypotheses according to the CVM, we follow the definitions of GC and DC given in the introductory paper of the CVM by Denison and Spreitzer (1991).

2.2 Organizational Mobile IT Adoption

By dividing OC into GC and DC, we can test relationships between the mobile IT adoption and OC of an organization. However, the disparate and varying nature of an organization's mobile IT adoption complicates the measurement of overall mobile IT adoption. To understand how OC influences mobile IT adoption, a more detailed view is necessary. One way of simplifying this task is to adopt a classification scheme that groups mobile IT usage in an organization into generic but distinguishable areas that share common goals (Tallon et al., 2000). Therefore, we adopt an approach that breaks mobile IT adoption down into distinct areas. This break-down of mobile IT adoption can be achieved by applying a process-level-oriented measure of mobile IT adoption across the value chain of an organization. While there are many recognized ways of depicting an organization in terms of process areas, the value chain is probably the most common and widely known approach. Basically, the value chain divides an organization into primary and supportive activities. The primary activities represent the process areas where the value creation occurs and represent a stream through the organization, ranging from inbound logistics, operations, outbound logistics, marketing and sales, to service (Porter and Millar, 1985). Therefore, the value chain's primary activities are synonymous with the conversion of input into output and are more applicable to manufacturing organizations. However, concerning the impact of IT on the value chain, generic models have been developed, which are based on the value chain, but are capable of representing the primary activities for organizations in any industry. With respect to these generic models, Tallon et al. (2000) conducted a literature review and defined six selective dimensions of IT business value, based on the value chain: customer relations (CR), production and operations (PO), supplier relations (SR), process planning and support (PPS), product and service enhancement (PSE), and sales and marketing support (SMS). Three of these represent primary activities (CR, PO, SR) and the other three (PPS, PSE, SMS) represent supportive activities. We focus on the primary activities for two reasons. Firstly, we assume that mobile IT adoption can best be recognized in primary activities, as these are more readily observable and

represent the value creation in an organization. Secondly, we argue that primary activities can be clustered into more internal- and externally-focused activities. We follow the definitions of Tallon et al. (2000) and define the process areas as follows:

CR includes market and customer-focused activities and goals, such as aftersales service and support, the distribution of goods of services, attraction and retention of customers, and support during the sales process. It focuses on interaction with the customers and, therefore, entails activities that focus mainly on interaction with external stakeholders, prospective and present customers.

PO includes activities where the service or the product is created. This is quite specific across different organizations, but the area can be specified in terms of common goals that organizations want to achieve. These include the improvement of production or service volumes and quality, the enhancement of operating flexibility and utilization of equipment, and improving productivity. In general, this area is focused on efficiency and creation. This represents the very internal activities of an organization.

SR, in turn, focuses on the interaction with other organizations, in particular, the suppliers of the particular organization. It is also very specific, but can be defined by common goals, such as gaining leverage over the suppliers, reducing supplier lead time and establishing electronic transactions, monitoring the supplied quality, and creating close relationships with the supplier. These activities focus on the interaction with external stakeholders, the suppliers.

To define the scope of the research and to focus our perspective on mobile IT adoption in these three areas, we define mobile IT as follows: Mobile IT encompasses highly portable mobile computing devices, including smartphones, handhelds, and tablet computers. Therefore, we focus on computer devices, which can be used “on the move” (Sørensen, 2011). Other mobile computing devices such as laptop computers are not included in this definition due to their restricted portability. Concerning these three types of devices (smartphones, handhelds, and tablet computers), any software application that supports the business and is in particular developed for these devices accounts as mobile IT

application. Mobile IT therefore includes mobile email as well as mobile CRM software, etc.

2.3 Hypothesis development

By applying an approach which measures the adoption of mobile IT in specific process areas of an organization, it is possible to examine whether certain cultural types will emphasize or deemphasize adopting mobile IT in certain areas. By mapping these relationships between cultural types and mobile IT adoption in different areas of organizations, the influence of OC on mobile IT adoption is revealed. Based on the CVM and specific areas of the value chain, we formulate the following hypotheses with respect to the research question. The primary goal is to test whether GCs and DCs display different emphases when adopting mobile IT in different process areas of the organization. These two cultural types are mainly different in terms of their external or internal focus. GC is internally-focused and DC is externally-focused. This distinction corresponds to the internal-external axis of the CVM. Researching the impact of these two constructs will reveal whether internally- or externally-focused organizations have a different focus in the adoption of mobile IT.

However, the CVM additionally reveals more generic characteristics of these cultural types. These characteristics can be used to formulate additional hypotheses concerning their emphasis in mobile IT adoption. Although we focus on the internal-external axis, we will formulate such hypotheses in addition, to obtain a more complete picture of the research issues. The additional hypotheses will also ensure that unexpected relationships are also explored.

2.3.1 Internal vs. External Focus

The internal vs. external focus represents the two environments in which an organization is embedded. The internal environment is represented by stakeholders that “belong” to the organization, such as employees. The external environment is represented by stakeholders with which the organization interacts, such as customers, suppliers, the government, etc. (Enns Dean B.Sweeney, Paul D., 2011). Based on the definition of the process areas, we are

able to identify areas which are concerned primarily with interacting with the external environment and those, which are more concerned with interacting with the internal environment. The process areas on which CR and SR focus include the interaction with external stakeholders, customers and suppliers. Therefore, these two process areas are mainly concerned with the external environment. DC is defined as cultures that have “a primary focus on the external environment” (Denison and Spreitzer, 1991). Therefore, we assume that a DC orientation focuses on innovation in process areas that are externally-focused, such as CR and SR. The main objectives of CR and SR also fit well with the strategy of DCs, which is generally described as focused on innovation, resource acquisition, the development of new markets and new products to gain new customers. These strategic goals can be achieved by innovation in CR (developing new markets, gaining new customers) and in SR (resource acquisition). If a DC favors such strategic goals, it can be argued that they will also focus on employing novel technologies that support those goals in the corresponding areas. Mobile IT is capable of supporting all activities of an organization, including CR and SR. We therefore posit that DCs will employ these technologies in CR and SR to achieve their strategic goals. We propose the following two hypotheses for DCs:

H1a: A developmental culture orientation has a positive impact on mobile IT adoption in customer relations.

H1b: A developmental culture orientation has a positive impact on mobile IT adoption in supplier relations.

In contrast, PO is an area that is primarily embedded in the internal environment of an organization. The tasks are performed mainly by employees and there is considerably less interaction with the external environment compared, to CR or SR. This area is, therefore, more related to the internal environment of the organization. Hence, this area is of particular interest for organizations, which focus on improvements in the internal environment. This fits the strategic goals of GCs, as they are described as having “a primary focus on the internal organization” (Denison and Spreitzer, 1991). GCs value participation, teamwork, people, and commitment, with facilitator-type leadership. Hence,

they emphasize the internal environment and strive to enhance the internal parts of the organization and internal value creation. If a GC favors such strategic goals, it can be argued that they will also focus on novel technologies that support these goals in the corresponding internal areas. It is well known that internal operations, such as PO, can also profit from mobile IT and that improvements in this part of the value chain can be achieved by its adoption. Based on the internal orientation of GCs, we posit that such a culture would focus on adopting mobile IT in PO and we therefore formulate the following hypothesis:

H1c: A group culture orientation has a positive impact on mobile IT adoption in production and operations.

2.3.2 Characteristics of the Cultural Types

In addition to the different implications derived from the distinction between an internal and external-focus, the CVM characterizes each cultural type with additional descriptions. As we use the CVM as our theoretical basis, we do not neglect this fact and thus formulate additional hypotheses.

Concerning the DC, the CVM states that such a culture is in general very open and fast in adapting to changes in the external environment, such as new technologies. This is supported by Stock and McDermott (2001), who found evidence that DCs generally emphasize the adoption of new technologies. This leads to the assumption that DCs strive to adopt mobile IT in all parts of their organizations, despite their external focus. Therefore, a DC would emphasize mobile IT adoption in all process areas. To obtain a complete picture of the influence of DC on the adoption of mobile IT, we propose, in addition to H1a und H1b, the following hypothesis:

H2a: A developmental culture orientation has a positive impact on mobile IT adoption in production and operations.

Concerning the GC, the CVM states that such a culture “has a primary concern with human relations. The purpose of organizations with an emphasis on group culture tends to be group maintenance. Belonging, trust, and participation are

core values, and primary motivational factors include attachment, cohesiveness, and membership. Leaders [...] facilitate interaction through teamwork” (Denison and Spreitzer, 1991). The strategy of GCs is to support interaction and teamwork in general and across all areas of the organization. A core part of interaction is communication. Thus, improving teamwork, especially technology that supports communication, is an important aspect. Hence, if a technology can be employed to support communication, GCs would emphasize its employment. As IT in general and mobile IT in particular is known to promote effective communication, this would assume that GCs would favor the adoption of mobile IT in all areas of the organization, despite their internal focus. Hence, we propose that a GC orientation would lead to the adoption of mobile IT in all areas of the organization. To obtain a complete picture of the influence of GC on the adoption of mobile IT, we propose, in addition to H1c, the following two hypotheses:

H2b: A group culture orientation has a positive impact on mobile IT adoption in customer relations.

H2c: A group culture orientation has a positive impact on mobile IT adoption in supplier relations.

3 Methodology

3.1 Survey Instrument

For the measurement of mobile IT adoption in CR, PO and SR, we use an instrument developed by Tallon et al. (2000) to measure the impact of IT on certain parts of the value chain. Tallon et al. (2000) formulated the items in such a way that they apply to manufacturing and service organizations. We therefore adapted them to measure – in particular – mobile IT across the value chain. To ensure that the participants give answers on the right subjects, we provided an explanation of what accounts for mobile IT with text and examples (illustrations of smartphones, handhelds and tablet computers) in the introduction section of

the questionnaire. Items were measured on a five-point Likert-scale. We used five items for each construct (CR, PO, and SR).

To measure GC and DC, we use the instrument of Iivari and Huisman (2007), which is based on Yeung et al. (1991). Iivari and Huisman (2007) report excellent validity and reliability estimates for the instrument. The original instrument was developed to measure the degree to which an organization emphasizes each of the four culture types described by the CVM. The instrument uses three five-point Likert-scale items for each construct. We adopted those concerning GC and DC.

To refine the questionnaire, it was independently reviewed and pre-tested by two members of our faculty and two practitioners. The questionnaire was evaluated in terms of issues such as understandability and wording, logical validity, format, and the ability of the items to capture the measured constructs. Based on the feedback, the questionnaire was refined further. All items used in the questionnaire are reported in Table 16 and Table 17, including the corresponding means and standard deviations for each item.

The following section relates to mobile IT applications used in your organization. Restrict your appraisal to applications already realized and in use rather than applications expected in the future. How does mobile IT boost company performance in the following areas of your organization? (1 = strongly disagree, 5 = strongly agree)

Code	Item	Mean	STDEV
CR1	Enhances the ability to provide aftersales service and support.	2.89	1.378
CR2*	<i>Enhances the flexibility and responsiveness to customer needs.</i>	3.35	1.212
CR3	Improves the distribution of goods and services.	3.14	1.249
CR4	Enhances the ability to attract and retain customers.	3.40	1.234
CR5	Enables us to support customers during the sales process.	3.22	1.278
PO1	Improves production throughput or service volumes.	2.90	1.145
PO2	Enhances operating flexibility.	3.75	1.033
PO3	Improves the productivity of labor.	3.83	1.001
PO4	Enhances utilization of equipment.	3.19	1.164
PO5*	<i>Reduces cost of tailoring products or services.</i>	2.48	1.110
SR1	Helps your corporation gain leverage over its suppliers.	2.49	1.154
SR2	Helps reduce variance in supplier lead times.	2.09	1.087
SR3	Helps develop close relationships with suppliers.	2.21	1.080
SR4	Improves monitoring of the quality of products/services from suppliers.	2.36	1.045
SR5	Enables electronic transactions with suppliers.	2.74	1.254

Table 16: List of Items with the Corresponding Mean and Standard Deviation.

Organizational Culture: (1 = strongly disagree, 5 = strongly agree)			
Code	Item	Mean	STDEV
GC1	The organization I work in is a very personal place. It is like an extended family and people seem to share a lot of themselves.	3.34	1.003
GC2	The glue that holds the organization I work in together is loyalty and tradition. Commitment to the organization I work in runs high.	3.79	0.852
GC3	The organization I work in emphasizes human resources. High morale is important.	3.90	0.878
DC1	The organization I work in is a very dynamic and entrepreneurial place. People are willing to stick their necks out and take risks.	2.87	1.016
DC2	The glue that holds the organization I work in together is commitment to innovation and development. There is an emphasis on being first with products and services.	3.28	1.069
DC3	The organization I work in emphasizes growth through acquiring new resources. Acquiring new products/services to meet new challenges is important.	3.20	1.068

Items marked with * were removed during the exploratory factor analysis.

Table 17: Continued.

3.2 Sample and Data Collection

The survey instrument was implemented as a web-based online questionnaire. For the sample building, we contacted CIOs (70%) and CEOs or directors (13%), and managers (17%) of large (more than 250 employees; 79% of the sample) and medium-sized (50-250 employees; 21% of the sample) organizations with headquarters in Germany, Austria or Switzerland. For the final sample, we used only answers from executives for two reasons. Firstly, they are most likely to have a holistic picture of mobile IT adoption in their organization and secondly, they can be regarded as dominant actors in their organizations and are, therefore, appropriate representatives to measure the OC of the corporation. Although this may limit the study to a single-respondent approach, this is a common approach (McDermott and Stock, 1999; Zu et al.,

2010) and proven valid. We used professional social networking sites (www.linkedin.com, www.xing.com) to search for matching participants and contacted them using the messaging function of the website. This ensures that the message is read by the corresponding person, as such messages are usually redirected to the addressee's private email address. By doing so, we contacted 640 persons and received 115 completed questionnaires between June and August 2012. We reviewed the answers and excluded small organizations (<50 employees) and answers from participants who are not executives. The final sample comprises 101 answers and represents a diversity of industries, which increases the generalizability of the findings. It includes companies from industries in manufacturing (35%), business services (15%), administrative services / government (8%), health care (6%), media / publishing (5%), technology / software (4%), education (4%), and others (29 %).

4 Results

In order to confirm the validity and reliability of the constructs, we applied exploratory and confirmatory factor analysis using SPSS and SmartPLS. During the exploratory factor analysis, we experienced problems with one item associated with PO and another associated with CR. The item CR2 indicated high loadings on two constructs – CR and PO. Item PO5 also indicated high loadings on two constructs – PO and SR. All other items clearly loaded with more than .4 only on the associated construct. Hence, we decided to remove PO5 and CR2 from the analysis. Thus, we measured PO and CR with four items and SR with five. This is still sufficient and the confirmatory factor analysis supports the decision. To test and estimate potential causal relationships, structural equation modeling (SEM) was built upon the defined constructs and the proposed hypotheses. To avoid non-convergence and improper solutions due to a small sample-size (N=101) and distribution assumptions, we used a partial least squares (PLS) approach, which is a variance-based method. For the data analysis and path modeling, we used the software SmartPLS 2.0 M3. The analysis followed the procedure recommend by Hair et al. (2011) and Gefen et al. (2011) and used the recommended values as evaluation criteria.

Principal Component Analysis (Varimax with Kaiser-Standardisation; 7 Iterations)																				
Components					Outer Loading (T-Stat)			Redundancy	Communality	Cronbachs α	Comp. Rel.	AVE								
5	4	3	2	1	Items															
					DC1	.695	.169	.268	.081	-.04	12.004									
					DC2	.747	.201	.216	-.076	.007	10.725	0	.597	.667	.817	.597				
					DC3	.738	-.045	.055	.1	.255	8.723									
					GC1	.179	.75	-.022	.133	.13	7.697									
					GC2	-.075	.78	.187	-.092	.124	5.06	0	.579	.638	.804	.579				
					GC3	.31	.63	-.006	.257	-.085	5.103									
					CR1	.228	-.127	.632	.141	.345	12.122									
					CR2*	-.023	.135	.579	.466	.248	-									
					CR3	.091	.858	.207	.065	.065	24.444	.133	.724	.872	.913	.724				
					CR4	.146	.842	.218	.099	.099	25.86									
					CR5	.278	.797	.096	.158	.158	36.369									

Table 18: Summary of Scales, Quality Criteria, Outer Loadings and the Exploratory Factor Analysis. Items marked with * have been removed.

Principal Component Analysis (Varimax with Kaiser-Standardisation; 7 Iterations)										
Components					Outer Loading (T-Stat)					
5	4	3	2	1	Items	Redun- dancy	Comm- unality	Cron- bachs α	Comp. Rel.	AVE
.126	.763	.134	-.058	.032	PO1	5.132				
.144	.747	.124	.308	.037		9.068				
.04	.776	.244	.082	-.006	PO3	7.297	.019	.615	.864	.615
.223	.679	.114	.066	.12	PO4	6.422				
.47	.538	.228	-.285	-.025	PO5*	-				
.749	.099	.26	-.003	.079	SR1	8.25				
.841	.169	.105	.059	.055	SR2	8.097				
.925	.101	.114	.022	.093	SR3	9.929	.033	.708	.924	.708
.827	.111	.011	.062	.075	SR4	8.484				
.707	.177	.144	.155	-.028	SR5	6.141				

Table 19: Continued.

In order to validate the proposed measurement model, we conducted validity assessments, based on internal consistency reliability, indicator reliability, convergent validity, and discriminant validity. The composite reliability values of the constructs range between 0.804 and 0.924 and are thus above the acceptable levels. Indicator reliability should ideally be higher than 0.7, which is the case here. The indicator reliability was further ensured by the exploratory factor analysis we performed beforehand. The average variance extracted (AVE) is between 0.579 and 0.724, which is above the recommended value of 0.5. Finally, discriminant validity was assessed by comparing the indicator loadings to all of their cross loadings. A common rule of thumb is that an indicator loading should be higher than all of its cross loadings, which applies to the present dataset. In addition to the validity assessments, we also tested the measurement model for multicollinearity among the independent variables. We applied the Fornell-Larcker criterion, which proved to be valid. Therefore, multicollinearity was not a problem in the proposed model. Table 18 and Table 19 include a summary of the scales, quality criteria, outer loadings and the exploratory factor analysis.

The model passed all criteria of the model evaluation. For the calculation of the t-statistics – the statistical significance level of the path coefficient – we applied a bootstrapping procedure with 5.000 bootstrap samples and 101 cases, which equals the number of observations from the original sample. Two out of six hypotheses proved to be statistically significant at a significance level of 5 percent (critical t-values for a two-tailed test above 1.96) or more. Thus, the empirical results reveal that different cultural types influence the adoption of mobile IT in organizations. The implications are discussed in detail in the next section. Figure 16 illustrates the results by displaying the path coefficients and their significance level (the * marks paths which meet a significance level of at least 5 percent) for each hypothesis, with the R² values of the dependent variables.

Additionally, we performed a finite mixture PLS (FIMIX-PLS) method to assess unobserved heterogeneity's existence. The results of this analysis did not

support the existence of multigroup or moderator effects (such as effects concerning industries, etc.).

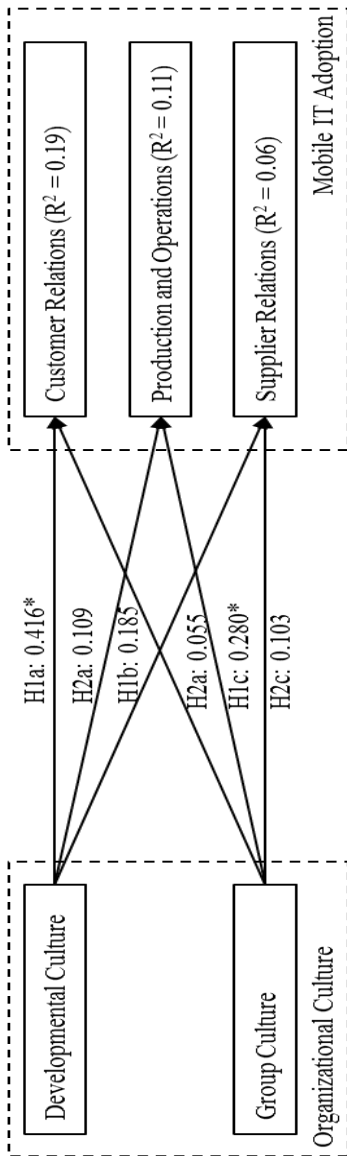


Figure 16: Results of the Analysis including the R² Values of the Dependent Variables and the Path Coefficients for each Hypothesis with the Corresponding Statistical Significance (* indicates p<0.05).

5 Discussion

The results of the PLS approach support H1a and H1c. A DC is positively related to higher levels of mobile IT adoption in CR, and a GC is positively related to higher levels of mobile IT adoption in PO. All other relationships are not statistically significant and are, therefore, rejected. Hence, the results suggest a positive influence of both GC and DC on mobile IT adoption. Based on the results, we argue that GC and DC should generally be taken into consideration as influencing factors in the organizational adoption of mobile IT. However, despite the fact that both GC and DC are positively related to mobile IT adoption, it is also evident that they influence mobile IT adoption differently and possibly lead to an unequal distribution of mobile IT adoption across the value chain. Organizations with a DC tend to adopt mobile IT primarily in CR, and organizations with a GC, in contrast, primarily adopt mobile IT in PO. This has several theoretical and practical implications.

Concerning the theoretical underlying, two (H1a and H1c) out of three hypotheses, based on the distinction between internal and external-focused OCs (H1a, H1b, and H1c), are supported. This supports our assumption that the internal-external axis influences mobile IT adoption across the value chain. The results show that organizations which display a culture which is externally-oriented, emphasize adopting mobile IT in more externally-oriented parts of their value chain, whereas organizations with an internally-oriented OC have a tendency to adopt mobile IT in internal parts of their value chain. This further implies that the general conclusion of Chen and Nath (2008), who suggest that more flexibility-oriented organizations would emphasize mobile IT adoption – in general – is not accurate. Related to their work, these results give more precise insights and imply that organizations with an emphasis on flexibility have an emphasis on adopting mobile IT, but not distributed equally cross their value chain. Thus, the results also have implications for the theoretical model of nomadic culture proposed by Chen and Corritore (2008), which is based on the conclusion drawn by Chen and Nath (2008). Therefore, we propose that the model of nomadic culture, which is only based on the assumptions made by the

control-flexibility axis, should be extended and revised in terms of the internal-external axis.

The managerial implications are also compelling. As argued in the introduction, mobile IT is capable of creating competitive advantages and value gains across the value chain. Based on the results, it can be argued that mobile IT adoption is influenced by a cultural bias. Organizations with an external-focus emphasize mobile IT adoption for external parts of their value chain, and organizations with an internal-focus emphasize mobile IT adoption for internal parts. These orientations prevent them from adopting mobile IT in all parts of their organizations, which in turn prevents them from exploiting the full potential of mobile IT. Hence, we recommend that managers evaluate, on a regular basis, whether mobile IT adoption is unequally distributed across their value chain. Such an evaluation will, on the one hand, reveal unused potential for mobile IT adoption and on the other hand, prevent mobile IT adoption being influenced by a cultural bias. Furthermore, such an approach creates an awareness of potential cultural bias in technology investment decisions concerning mobile IT.

There are several limitations to the current research design that should be noted. Firstly, the sample size, while adequate, could be larger to allow testing more relationships within one dataset. Secondly, the research findings are derived only from quantitative data. Additional qualitative data could reveal further insights into why GCs focus on mobile IT adoption in PO, but DCs on mobile IT adoption in CR. Thirdly, we did not test all four cultural types included in the CVM. Testing for all four types could further enhance our understanding and contribute to a more complete picture of the influence of OC. Another limitation is that we focused on primary process areas. Future studies should also include supportive process areas. Concerning the practical implications, we would further like to motivate future studies to include performance and satisfaction measures. This study is limited on this aspect, as we did not research whether a certain configuration leads to higher satisfaction levels with mobile IT adoption. However, other studies (Yarbrough et al., 2011), which are based on configuration theory, conclude that setups in which the values of the OC fit the values associated with a certain IT artifact, are more likely to achieve higher

performance outputs than setups with a misfit. Additionally, we propose that future research should test the relationship between strategy, culture, and mobile IT adoption. Such relations would further extend existing knowledge and support more detailed recommendations for adopting mobile IT in organizations.

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Declaration of Contribution

Title	Das mobile Web 2.0 im Unternehmen
Authors	Thomas Sammer, Thomas Walter
Contribution Thomas Sammer	Lead author; Overall contribution: >90%
Contribution Thomas Walter	Input concerning the latest findings from Thomas Walter's work; Review of the article

Table 20: Declaration of contribution, concerning contribution A.

Title	Success and Failure: Two Longitudinal Case Studies on Media-Tablet Usage in CRM
Authors	Thomas Sammer, Sandro Vögeli, Andrea Back
Contribution Thomas Sammer	Lead author; Research design; Data collection of T2; Analysis of T1 and T2 data; Phrasing of the text; Overall contribution: >80%
Contribution Sandro Vögeli	Data collection of T1 (in his master's thesis); Review of the paper
Contribution Andrea Back	Final review of the paper

Table 21: Declaration of contribution, concerning contribution B.

Title	The New Enterprise Mobility: Seizing the Opportunities and Challenges in Corporate Mobile IT
Authors	Thomas Sammer, Hans Brechbühl, Andrea Back
Contribution Thomas Sammer	Lead author; Research design; Story framing; Definition of “Second Generation Enterprise Mobility”; Data analysis; Phrasing of the text; Overall contribution: >80%
Contribution Hans Brechbühl	Contribution of the data set “round table discussions”; Story framing; Definition of “Second Generation Enterprise Mobility”; Several reviews of the paper
Contribution Andrea Back	Final review of the paper

Table 22: Declaration of contribution, concerning contribution C.

Title	Barrieren am Weg zum Mobile Contactless Payment: Eine Marktanalyse und Bestandsaufnahme der Situation in der Schweiz
Authors	Thomas Sammer, Christian Lazur, Thomas Walter, Andrea Back
Contribution Thomas Sammer	Lead author; Literature review; Story framing; Research design; Data analysis; Phrasing of sections 1, 2.4, 2.5, 4, 5; Overall contribution: >70%
Contribution Christian Lazur	Story framing; Data collection; Data analysis; Phrasing of <ul style="list-style-type: none"> • Section 2.1 “Umsetzung von MCP per NFC”; • Section 2.2 “Beschreibung der relevanten Akteure”; • Section 2.3 “Identifizierung der relevanten Akteure”; • Section 3 “Untersuchungsaufbau”; Review of the paper
Contribution Thomas Walter	Story framing; Phrasing of section 2.5 “Forschungsmethode Fallstudienforschung”; Review of the paper
Contribution Andrea Back	Final review of the paper

Table 23: Declaration of contribution, concerning contribution D.

Title	Why is there Variation in the Nature of Organizational Mobile IT Adoption? An Empirical Study of the Influence of Organizational Culture on Organizational Mobile IT Adoption
Authors	Thomas Sammer
Contribution Thomas Sammer	Single author paper; Overall contribution: 100%

Table 24: Declaration of contribution, concerning contribution E.

Herewith all named authors declare that the summarized contributions of the named research papers (see above) are correct.

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- 2010** **ÖGDI Award, 1st Place**
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- 2007** **11th World Business Dialogue, Invitation and Grant**