



**Universitat Ramon Llull**

## **DOCTORAL THESIS**

Title: Mobile Marketing and the Physician in Private Practice – An  
Exploratory Study with Gynecologists in Germany

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## ABSTRACT

Mobile communication technologies have penetrated markets throughout the world, and thus mobile marketing is likely to have a strong influence on future business activities and consumer behavior, as well as on national and global markets. While academic research has started to focus on particular industries in the mobile marketing context, this study shifts the focus to the particular professional group of physicians in private practice.

After first developing key concepts related to mobile marketing in the physician domain, the research carried out with gynecologists in Germany then provides a number of relevant insights stemming from both physicians not employing the mobile medium in their medical practice and the few who already do so. For the group of Non-Users, the findings indicate that several key adoption barriers seem to prevent the inclusion of the mobile channel, including the physicians' lack of time, economic and legal considerations, and lack of information. The study also identifies the degree of usefulness for a range of mobile activities as perceived by the physicians themselves, and provides insights into which factors would be conducive for physicians to start using the mobile medium for said purposes.

Both ordinal logistics regression and direct logistics regression are employed to gain a better understanding of how demographic factors and status of private mobile use impact physician responses. This yields significant findings across the board, with interesting implications given the demographic shift currently taking place in the German healthcare arena. The research also provides evidence from a group of physicians who already take advantage of the mobile channel in their medical practice. We identify current, planned and not-planned mobile activities, and present the reported experiences along several lines resulting from the use of mobile devices and technology in their medical practice. Implications, limitations and future research avenues conclude this dissertation.

**Key Words:** Mobile marketing, mobile CRM, adoption barriers

## RESUMEN

La rápida y fuerte penetración de las tecnologías de la comunicación móvil en los mercados mundiales presenta al marketing móvil con una fuerte influencia en la actividad empresarial y en la conducta del consumidor, tanto a nivel nacional como global. Mientras que la investigación académica se ha centrado en estudiar industrias específicas en el contexto del marketing móvil, este estudio se centra en un grupo profesional muy concreto: los médicos en consulta privada.

En la primera parte de esta investigación se desarrollan los conceptos claves relacionados con el marketing móvil en el área médica. El estudio llevado a cabo en ginecólogos en Alemania proporciona un número relevante de aspectos tanto en el grupo de médicos que no utilizan el medio móvil en su práctica médica como para los pocos que ya lo utilizan. En el grupo de los no usuarios, los resultados indican varias barreras determinantes que dificultan la adopción del medio móvil como son la falta de tiempo del médico, consideraciones económicas y legales, y la falta de información. El estudio también identifica el grado de utilidad percibido por los médicos para diversas funciones de los móviles y aporta sugerencias respecto a los factores que pueden contribuir a la adopción de este medio.

Se utilizan los métodos de Regresión logística ordinal y regresión logística directa con el fin de establecer en qué medida los factores demográficos y experiencia previa en el uso de medio móvil influyen sobre las decisiones y percepciones de los médicos. El estudio también presenta los resultados de un grupo de médicos que ya está utilizando canales móviles en su práctica médica. Se identifican tendencias, actividades planificadas y no planificadas a través de los móviles y se informa de los resultados del uso de los dispositivos y tecnología móvil en su práctica médica. Las implicaciones, limitaciones y futuras líneas de investigación concluyen esta disertación.

**Palabras Claves:** Marketing móvil, CRM móvil, barreras de adopción

## RESUM

La ràpida i forta penetració de les tecnologies de la comunicació mòbil als mercats mundials presenta al marketing mòbil amb una forta influència en l'activitat empresarial i en la conducta del consumidor, tant a nivell nacional com a global. Mentre que la recerca acadèmica s'ha centrat a estudiar indústries específiques en el context del marketing mòbil, aquest estudi es centra en un grup professional molt concret: els metges en consulta privada.

A la primera part d'aquesta recerca es desenvolupen els conceptes claus relacionats amb el marketing mòbil a l'àrea mèdica. L'estudi dut a terme en ginecòlegs a Alemanya proporciona un nombre rellevant d'aspectes tant en el grup de metges que no utilitzen el mitjà mòbil en la seva pràctica mèdica com per als pocs que ja ho utilitzen. En el grup dels no usuaris, els resultats indiquen diverses barreres determinants que dificulten l'adopció del mitjà mòbil com són la falta de temps del metge, consideracions econòmiques i legals, i la falta d'informació. L'estudi també identifica el grau d'utilitat percebut pels metges per a diverses funcions dels mòbils i aporta suggeriments respecte als factors que poden contribuir a l'adopció d'aquest mitjà.

S'utilitzen els mètodes de Regressió logística ordinal i regressió logística directa amb la finalitat d'establir en quina mesura els factors demogràfics i l'experiència prèvia en l'ús de mitjà mòbil influeixen sobre les decisions i percepcions dels metges. L'estudi també presenta els resultats d'un grup de metges que ja està utilitzant canals mòbils en la seva pràctica mèdica. S'identifiquen tendències, les activitats planificades i no planificades a través dels mòbils i s'informa dels resultats de l'ús dels dispositius i tecnologia mòbil en la seva pràctica mèdica. Les implicacions, limitacions i futures línies de recerca conclouen aquesta dissertació.

**Paraules Clau:** Marketing mòbil, CRM mòbil, barreres d'adopció

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# CHAPTER 1

## INTRODUCTION

### 1.1 General Context of the Research

The rapid proliferation of mobile technologies and devices presents marketers of all industries and geographic regions with new and, in many cases, unique possibilities to reach out to their existing and potential customers. The advent of digital media has dramatically changed the way consumers interact with companies, the media, and each other (Winer, 2009). Mobile communication technologies have penetrated markets throughout the world, and thus mobile marketing is likely to have a strong influence on future business activities and consumer behavior, as well as on national and global markets (Dai and Palvia, 2009). Mobile marketing has been defined as “the use of wireless media as an integrated content delivery and direct response vehicle within a cross-media or stand-alone marketing communications program” (Mobile Marketing Association, 2008). Mobile marketing is changing the way organizations communicate with their target demographics. A wide variety of marketers including airlines, banks, and consumer product and pharmaceutical companies are increasingly capitalizing on the marketing opportunities presented by mobile technologies and devices.

Marketers and consumers have recognized the mobile medium as an important communication channel and trends indicate that this development will continue unabatedly. Marketing spending on digital media outpaces spending on traditional media channels such as television, print and radio. Shoppers worldwide are expected to spend about \$119 billion on goods and services purchased via mobile phones by 2011 (ABI Research, 2010). As a result, mobile marketing expenditure is estimated to reach \$20 billion by 2015 (Gartner, 2011). The International Telecommunications Union (2010) estimates that approximately 6.1 trillion text messages were sent worldwide in 2010, roughly 200,000 text messages every second. Strategy Analytics (MacQueen, 2010) predicts combined global annual consumer and advertiser expenditure on mobile media, which includes handset browsing, mobile applications, mobile

games, mobile music, mobile video, mobile TV, ringtones, wallpapers and alerts, and associated data, will rise from just under \$75 billion at the end of 2010 to just over \$138.7 billion by 2015. In the United States alone mobile advertising expenditures increased 95% in the first six months of 2012, reaching \$1.2 billion (PriceWaterhouse Coopers, 2012). However, mobile marketing is not embraced by all marketers equally, as for many it remains a mysterious and challenging new component of a company's communication mix (Pousttchi and Wiedemann, 2010).

Academic research on mobile marketing and related subtopics is still considered nascent and scattered across disciplines (Shankar & Balasubramanian, 2009). At the same time, academic research is evolving, shifting from the theoretical and conceptual to the applied and concise. As mobile devices and technologies find increasing applications in different industries, academic researchers have refined their efforts to include industry-specific research, such as retail (Shankar et al., 2010), banking (e.g Riivari, 2005; Cruz et al., 2010), hospitality (Wang and Wang, 2010), education (Scornavaca, Huff and Marshall, 2009) and the pharmaceutical industry (e.g BenMousa, 2010). This evolution of academic research, moving from theoretical bases to industry-specific applications, is based on the understanding that while many aspects of academic findings are valid for a wide variety of industries and marketers, others are unique.

This exploratory research is aimed to advance the current research on the topic of mobile marketing by extending it to a particular professional group – physicians in private practice. More specifically, this study intends to shed light on a number of issues connected to the use of mobile devices and technologies for marketing communication purposes by those physicians working out of private practices. To the best knowledge of the author, no prior academic research addresses this particular issue.

The necessity for marketing activities for physicians working out of their own private practice in particular has been noted by a number of authors including West and Blankenship (1975), Van Doren and Blank (1992) and Letter

(2005). The overwhelming consensus seems to be that marketing activities do provide the opportunity to enhance the trust of the patients and build long-term relationships with them while maintaining a high quality of service. Just as the mobile medium is increasingly playing an important part in their communication to existing and potential customers, it seems to be a question of time until also the professional group of physicians in private practice will turn to benefit from the opportunities it presents for them as marketers.

Physicians as a professional group, play a fundamental role in society. In Germany alone, more than 340,000 physicians (German Medical Association, 2012) of all specializations provide care for over 80 million people. More than 121,000 physicians in Germany worked out of their own private practices at the end of 2011, according to statistics provided by the German Medical Association (2012). For the particular case of Germany, an important demographic shift is taking place in the medical landscape. First, the medical profession is changing from being a “male” dominated professional field, to a “female” dominated field. The percentage of female physicians of all specialties, including gynecologists are continuously increasing. As noted by Kopetsch (2010), female medical students already significantly outnumber male students in German medical school, therefore leading to an increasing intensification of this trend in the future. At the same time, the German healthcare system is witnessing a “retirement wave” of physicians of all specialization. Forecasts predict that by the year 2015, more than 57.000 physicians in Germany will get ready to retire from their profession (Kopetsch, 2010).

For physicians in private practice, a certain number of mobile marketing activities is relevant, given that they are facing some of the same market dynamics faced by small business owners in other fields. As the existing body of knowledge in this specific area is rare, we believe that academic research aimed to contribute to fill the existing void is called for.

## **1. 2 Purpose and Scope of the Research**

The specific issue of mobile marketing for the physician in private practice is virtually unexplored. This is most likely due to two factors: that mobile technologies and the resulting opportunities for marketing activities are a relatively new phenomenon, and that physicians are a professional group that receives relatively little attention from academic researchers in the field of marketing.

For the specific discussion of mobile marketing in the physician context, it is important to state that the intriguing theories and their applications pertain to those physicians who work out of their own private practice. Whereas physicians working in a hospital are employees, private practice physicians can be perceived as small business owners for whom marketing activities are more important. Interestingly, this latter group of physicians, and the focus of this dissertation, is only very slowly embracing the mobile medium as a tool for marketing communication and customer relationship management. While most physicians do own mobile devices for private and professional use, relatively few appear to employ the mobile medium for marketing communication purposes aimed towards existing and potential patients. Though many opportunities exist to incorporate the mobile medium into the marketing communication mix, it remains unclear for which specific communication activities and for which purposes this professional group perceives the highest value of mobile technologies for the future. In other words, private physicians could use mobile marketing in millions of ways, but how they could do it successfully is a mystery. Finally, if the notion is accepted that physicians in private practice could benefit from the inclusion of the mobile channel into their communication with existing and potential patients, what are the major barriers? Of equal interest for the researcher are the possible influences of gender, age and the status of private mobile phone use on physicians' respective evaluations.

The majority of physicians in private practice do not yet fully employ mobile marketing, but a smaller group has begun to do so. From this group of



“early adopters”, this research aims to understand how and why these physicians employ mobile technologies in their medical practice, and gain insights from their experiences.

### **1.3 Research Objectives and Questions**

The objective of this exploratory research is to explore a number of important issues related to the use of mobile marketing by the physician in private practice, focusing on non-users as well as the pioneers in the field, or this group of physicians already taking advantage of the mobile medium. This research is based on a research study conducted with gynecologists in private practice in Germany. As this study is the first to focus on the topic of mobile marketing in the context of physicians in private practice, the primary research objectives of this study can be defined as follows:

1. To explore the reasons why gynecologists in private practice in Germany do not use the mobile medium to communicate with existing and potential patients.
2. To understand for which activities and for which objectives these physicians perceive the mobile medium as being best suited for communication with existing and potential patients.
3. To determine how important theoretical reduction-in-adoption barriers are in incorporating the mobile medium into the physician-patient communication process.
4. To explore whether gender, age, and status of private mobile use influence the research objectives above.
5. To examine for what purposes the pioneers, or early adopters in this field, already have or are planning to incorporate the mobile medium in their communication with their existing and potential patients.
6. To understand whether a physician’s gender, age and status of private mobile use influences mobile activities.

7. To examine the benefits gained resulting from the actual incorporation of the mobile medium as perceived by these physicians.

#### **1.4 Dissertation Structure**

This dissertation contains six chapters. This introductory chapter is followed by chapter 2, in which a review of relevant literature and research on mobile marketing are presented. The review of academic literature encompasses findings of both general and industry-specific academic research of the mobile marketing phenomenon.

Chapter 3 of this dissertation moves the focus to academic research and practical knowledge related to the specific professional group of physicians. This chapter develops key concepts and reviews relevant research results pertaining to physician marketing, the macro drivers favorable to mobile technology use in the physician-patient communication, as well as research on the topic of technology adoption focusing specifically on physicians. The purpose of this chapter is to connect the academic research on mobile marketing in general as presented in the preceding chapter to the physician in private practice context.

Chapter 4 reiterates the research objectives, states the elaborated research questions, describes the research sample and data collection process, elaborates on the questionnaire development and discussed the research methodology including the treatment of variables and statistical analysis used in analyzing the quantitative data obtained through survey research.

In chapter 5 the findings of the research are discussed and analyzed, thereby answering the individual research questions as stated in chapter 1 of this dissertation.

In chapter 6, the research results for both physician groups are reviewed, the resulting implications of the findings elaborated and the limitations of the study stated.

Chapter 7 presents the final conclusions drawn from this research and presents suggestions for future research.

## **1.5 Summary**

The 21<sup>st</sup> century is the mobile century. We are at the threshold of a mobile age that has the potential to “revolutionize society” (Grant, 2008). As mobile technologies present marketers of all specializations with new and often unique possibilities to communicate with their target audience, there is no doubt they will profoundly impact the way physicians communicate with existing and potential patients in the future. If mobile marketing as a research topic is still in its infancy (Varnali and Toker, 2010), then we could argue that mobile marketing for physicians as a research topic is still in its embryonic stage.

This exploratory study aims to add another stage in academic research on the topic by answering a number of specific questions for a specific professional group. The author of this study is unaware of any paper or study focusing specifically on the topic and research question presented.

Physicians in private practice play an important role in society, hence the understanding of mobile marketing in this context should prove useful for a number of groups, including the physicians themselves, patients, and software developers, among others.

## CHAPTER 2

### REVIEW OF RELEVANT LITERATURE

#### 2.1 Introduction

The rapid evolution of digital and mobile technology combined with the rapid proliferation of mobile devices around the world has been the driving force behind the “mobile revolution.” As Grant (2008, p. 343) points out, “we are at the threshold of yet another revolution: the mobile revolution. The combination of internet and IP-based technology has yielded a new technology system that has the potential to revolutionize society as much as any previous communication technology.” The emergence of the mobile channel has led to a plethora of new marketing applications and offerings, giving rise to the “brand-in-the-hand” era which is characterized by the potential for branding and marketing communication to consumers anywhere, at any time (Sultan and Rohm, 2005).

The mobile phone has been the key driver of the mobile revolution. Ahonen (2008) considers the mobile the 7<sup>th</sup> mass media following, in chronological order, print, recordings, cinema, radio, television and the Internet. Mobile devices have become ubiquitous, with penetration rates eclipsing that of most other communication channels. According to the International Telecommunications Union (2011), mobile-cellular subscriptions are approaching 6 billion, with global penetration reaching 87% in the developed world, and 79% in the developing world. Gartner (2012), the information technology research and advisory company, reports the worldwide sales of mobile phones to end users reaching 419 million units in the second quarter of 2012, 36.7% of which are smart phones. In addition to the mobile phone, mobile tablet computers, such as Apple’s iPad, are also pushing the frontier of mobile marketing for consumers and marketers alike. Apple sold three million iPad minis and fourth generation iPads in the three days following their launch in November 2012 (Apple, 2012).

A number of categorizations have been used to summarize and conceptualize research findings in the field of mobile marketing and to identify future research opportunities (Drossos and Giaglis, 2010; Huang and Symonds, 2009; Leppäniemi and Karjaluoto, 2008; Shankar and Balasubramanian, 2009; Varnali and Toker, 2010). The consensus seems to be that considerably more academic research will be necessary, and thus forthcoming, in the future. “Therefore, it can be concluded that although there is substantial progress in the field of mobile marketing, academic research is still in its infancy and offers fruitful research avenues” (Varnali and Toker, 2010).

## **2.2 The Mobile Medium as a Unique Marketing Channel**

Whereas Apple may have given rise to the “i-”, the rapid development of mobile technology and the proliferation of mobile devices have given rise to the “m-“. “The sheer scale, utility and omnipresence of mobile phones has formed a global network unrivalled by any other human innovation since the Internet, with society fully embracing the power of voice and text to connect with one another” (Wireless Federation, 2009). Pousttchi and Wiedemann (2010) call mobile marketing a new tactical instrument of marketing communication using the mobile channel to promote goods, services and ideas, providing anytime and anywhere interaction, location and situation dependency, targeted addressing of consumers, and inherent measurement of campaign effectiveness. Bauer et al. (2005) name “personalization, ubiquity, interactivity and localization” as the key characteristics of mobile marketing. Because mobile marketing is interactive and allows for two-way or multi-way communication between sender(s) and receiver(s), it is conducive to mobile advertising, promotion, customer support, and other relationship-building activities (Shankar and Balasubramanian, 2009). The authors provide an insightful overview of the key differences between mass and mobile marketing as shown in table 2.1 below.

Dimension	Mass Marketing	Mobile Marketing
Scope of audience	All existing and potential users of the products	Existing and potential users of the product owning a mobile device, who opt-in to receive communication
Potential type of communication	Text, voice and video in rich formats	Text, voice, and video in very limited visual space with limitations in transmission speed
Typical direction of communication	One way: Marketer to consumer	Interactive between marketer and consumer
Ability to deliver message by target location	Low	High
Ability to measure and track response	Low	High
Consumer targetability	Low	Medium
Cost per target audience	High	Low

Table 2.1: Differences between mass and mobile marketing. Adapted from Shankar and Balasubramanian (2009).

Friedrich et al. (2009) argue that the mobile channel outperforms all other marketing channels in the following five ways:

1. Consumer access - the continuous and location-independent access to consumers via voice, messaging, or portal platforms
2. Customer insight - the access to a wide range of consumer data ranging from demographics, communication and social patterns, to location information
3. Customer dialogue - the interactive features of the mobile device and the opportunity of consumers to actively respond to communication instead of only passively receiving it
4. Customer emotions - the high degree of personal attachment and interest that mobile device owners exhibit towards it
5. Customer transactions, such as mobile payment

These five dimensions of the mobile customer's experience provide a distinct context for marketers who must present a unique value proposition to connect with their customers. According to Ahonen (2008, pp. 60-68), the mobile phone, being the principal mobile device, has seven unique characteristics that set it apart from any other media device and channel: it is a truly personal media, is permanently carried, is always "on", has a built-in

payment mechanism, is available at creative impulse, allows for accurate consumer information and also captures the social context.

Leppäniemi and Karjaluoto (2008) provide a useful framework for the conceptualization of mobile marketing, consisting of mobile advertising, promotions, direct marketing and customer relationship management (CRM). The authors also delineate the different mobile options in each category. The complete framework is detailed in table 2.2.

<b>Mobile Marketing Communications</b>			
<b>Advertising</b>	<b>Promotions</b>	<b>Direct Marketing</b>	<b>CRM</b>
<b>Web</b> * Mobile internet (banner ads, interstitials) * Mobile search * Mobile portal	<b>Branded content</b> * Entertainment and infotainment (advergaming, ringtones, logos and wallpapers, news, music)	<b>Personalized permission-based messages</b> * SMS, MSM * WAP push * Email	<b>Customer Services</b> * Alerts and reminders (e.g. Appointments, medication intake, flight delays) * Mobile check-in services * Mobile ticketing * Content catalogs
<b>Broadcast</b> * Mobile TV * Bluecasting	<b>Competitions</b> Interactive concepts (Quiz, voting, text-2-win)		<b>Mobile Commerce</b> * Banking and brokerage * Mobile payment * Bidding * Betting and gambling
<b>Physical browsing</b> * Scanning (Hypertag, RFID, bar code, upcode)	<b>Other</b> * Coupon/ voucher * Sample ordering * Information request * Special offers		<b>Market Research</b> * Surveys (e.g. customer and patient satisfaction surveys) * Polls
<b>Other</b> * Visual radio * In-game advertising * Idle screen advertising * Ringback tones			<b>Mobile Community</b> * Mobile blog * Mobile magazines and newsletters * Fan club solutions
			<b>Corporate Services</b> * Mobile workforce * M2M (machine-to-machine)

Table 2.2: Mobile marketing communications framework. Adapted from Leppäniemi and Karjaluoto (2008).

In terms of marketing communications, the mobile channel can take the form of a substitute, complementary or supplementary channel (Sinisalo et al., 2007). Used as a substitute channel, the mobile replaces one or several of the existing channels through which marketing activities used to be provided. As

a complementary channel, mobile is used as an additional conduit providing existing activities to customers who want to interact with the company through the mobile medium. As a supplement, the mobile medium provides novel supplementary activities that are designed for and available through the mobile medium. For example, the utilization of a mobile flight status application might fall into this category. Given that the mobile channel is preliminarily used as a complementary one, the compatibility support capabilities with other channels or media become an important consideration. The mobile channel is well suited to support or be supported by existing media used in marketing (Pousttchi and Wiedemann, 2010). At the same time, mobile media makes existing traditional media more effective by making them interactive and more measurable (Sharma et al. 2008, pp. 102 -105).

Leppäniemi and Karjaluoto (2008) differentiate between two general approaches in mobile marketing: push and pull. Push-based mobile marketing refers to any content sent by or on behalf of advertisers and marketers to a mobile device at a time other than when the subscriber requests it. Push-based mobile marketing includes audio, short message service (SMS) messages, e-mail, multimedia messaging, cell broadcast, picture messages, surveys, or any other pushed advertising or content (Mobile Marketing Association, 2008). Pull-based mobile marketing is defined as any content sent to the mobile subscriber upon request, shortly thereafter on a one-time basis (MMA, 2008). An example of pull-based mobile marketing would be a consumer requesting a mobile coupon to be delivered to his or her mobile phone. The same categorization is provided in the context of location-based advertising by Bruner II and Kumar (2007). As push messages are often considered spam, pull messages are considered preferable (Pousttchi and Wiedemann 2010). In addition to pull- and push-based marketing, Palka, Pousttchi, and Wiedemann (2009) identify mobile word-of-mouth or mobile viral marketing as the third basic marketing strategy offered by the mobile medium, in which consumers transmit mobile marketing content to people in their social sphere.

Organizations and companies of all types and sizes are using the mobile channel for marketing communication purposes. From the French cosmetics



company L’Oreal to Unicef, from The Home Depot to the Florida Department of Health, companies and organizations of all types have successfully used the mobile channel to educate, increase brand awareness, drive sales or provide better customer service (Mobile Marketing Association, 2012). Additional objectives associated with mobile marketing include the acquisition of new customers, marketing new products or offering new services, cross-marketing and up-selling, strengthening customer loyalty, market research, address generation, increasing customer satisfaction and improving customer service (e.g., Steimel, Paulke and Klemann., 2008; Pousttchi and Wiedemann, 2010, Moth, 2012). These possible mobile marketing objectives are likely to vary depending on the type of organization, industry or specific professional group, time frame, available resources and target segments, among other factors. Possible mobile marketing objectives for physicians in private practice will be elaborated in chapter 3 of this dissertation.

Academic researchers have begun to focus on the applications and implications of mobile marketing within specific industries. Shankar et al. (2010) discuss the options of mobile marketing communication available to companies in the retail industry. The authors note that retailers may engage in mobile marketing practices through mobile websites, mobile emailing and messaging, mobile advertising, mobile couponing, mobile customer service and social network management, thereby potentially enhancing customer loyalty. For the banking industry, Amin et al. (2008) see new opportunities to extend existing services while improving competitiveness. Rivari (2005) identified improved customer service, reduced costs, increased reactivity and increase in brand image as driving factors for mobile banking services. Possibilities for mobile technologies and devices in the educational arena have also been discussed. Scornavaca, Huff and Marshall (2009) claim that the inclusion of SMS messages in the classroom can enhance students’ learning experience. In the hospitality industry, hotels are increasingly making use of the mobile channel, by offering mobile hotel reservation (MHR) services as discussed by Wang and Wang (2010). Jensen (2010) finds that even libraries can make good use of mobile devices for document delivery and organization. Companies in the pharmaceutical industry use the mobile channel to send medication intake and

replenishment reminders via SMS to patients (BenMousa, 2007). Meanwhile, pharmaceutical companies are increasingly equipping their sales forces with mobile devices (e.g. BenMousa, 2005; Padula, 2007). Specifically, Apple's iPad has made its mark on pharmaceutical marketing efforts directed towards physicians. According to a Medical Marketing & Media web article (Comer, 2011a), four of the largest pharmaceutical companies will give sales representatives iPads preloaded with iRep, a new physician-detailing mobile application. The same article highlights the appeal of the iPad to pharmaceutical and healthcare companies: "rather than as a consumer marketing tool or health application, some healthcare companies find the iPad's biggest advantage is in the hands of their marketing and sales forces. ...Rather than one-size-fits-all brochures or static laptop lectures, sales and marketing create individualized, interactive presentations." Thus, physicians as a professional group in general, and physicians in private practice in particular, are being exposed to an increasing degree to mobile marketing as targets of marketing efforts by the pharmaceutical industry, of which they are the key clients. In addition to a number of macro drivers identified in chapter 3, this exposure should prove useful to those physicians interested in becoming mobile marketers themselves.

According to Comer (2011b), pharmaceutical companies are also increasingly using mobile medical reference apps to reach physicians who are at this point primarily confined to sponsorships. Pharmaceutical companies are also increasingly targeting patients or consumers with health-related apps. An example is a mobile app for iPhone and iPad users introduced by the pharmaceutical company Merck for type 2 diabetes patients that permits users to track their medications, nutritional intake and activity level, and to store data and create reports for discussions with their physicians or diabetes educators. It appears that through these consumer- or patient-directed apps, the pharmaceutical industry is using the mobile channel as a branding tool, while also contributing to the development of the "informed patient" – an issue that will be discussed in the following chapter of this paper. An interesting aspect of mobile apps directed towards patients or consumers surfaces in a Research2Guidance web article (Jahns, 2010) presenting the results of a Global mHealth survey regarding the future distribution channels for mobile

health applications. The study forecasts that by 2015, hospitals (68%), physicians (65%) and healthcare websites (56%) will become more important as distribution channels than app stores. Mobile apps can be considered the future of patient education and disease management, promising better tracking, improved adherence and richer patient-physician dialogue, according to Arnold (2011). Meanwhile, branded pharmaceutical websites, which are increasingly optimized for mobile devices and access, are taking on a more prominent role in the marketing effort directed towards both physicians and consumers, and have been considered very effective in driving conversions among prospects and patients (Radwanick, 2011). Pharmaceutical companies are also increasingly using electronic social media, whose potential grows with the increasing reach from the increasing reach of the mobile channel through the proliferation of mobile devices and networks. Benefits associated with mobile technology adoption by players in the healthcare sector, such as hospitals, include improved communication, cost reduction, and better patient care (Standing and Standing, 2008).

Mobile marketing is not without obstacles. For many companies, mobile marketing remains a mysterious and challenging new component of a company's communication mix (Pousttchi and Wiedemann, 2010). The challenges for mobile marketing are multifaceted, stemming on one side from inherent physical limitations of the mobile device, technology and implementation issues, and from consumer's perceptions on the other. A report by J.P. Morgan (2010) cites the small screen size of mobile devices and the lack of a standard mobile platform as major obstacles. The limited screen size of mobile phones in particular limits the type and amount of information that can be displayed. However, the report does acknowledge that mobile tablet devices seem to overcome this limitation.

The lack of a standardized mobile platform refers to the multitude of mobile phone models in the market, with different physical and functional designs and screen sizes on the one hand, and technological differences in terms of supported technologies, browser types and operating systems on the other. According to the research firm Gartner (2011), the market share of

worldwide smartphones by operating system is fragmented, with corresponding market shares of Symbian (37.6%), Android (22.7%), Research in Motion (16%), iOS (15.7%), Microsoft (4.2%) and other operating systems (3.8%). This fragmentation illustrates the dilemma for mobile marketers, who either have to bet on one operating system or pay considerably more to make their mobile communication compatible with various operating systems. As reported by Burstein (2013), results from the 2012 MarketingSherpa Mobile Marketing Survey, the top three barriers cited by marketers include inadequate resources and expertise, insufficient budget for mobile initiatives and lack of efficient mobile marketing strategy.

The extent of these obstacles depends on the type of mobile marketing communication used. SMS messages do not require adaptation to a specific operating system, whereas MMS messages or mobile applications do. As Valsecchi, Renga and Rangone (2007) note, it appears that many marketing managers resist using mobile advertising campaigns, for a number of different reasons. First, the uncertainty of returns on investment might impede including the mobile channel into the overall marketing communications mix. Secondly, a lack of specific competences, either technical or marketing, might equally contribute to neglecting the adoption of mobile marketing. A third factor is a lack of collaboration and information sharing between their company and other mobile value chain players (mobile network operators, mobile phone producers, marketing agencies). Finally, there is no standardization of marketing and mobile technology.

There are also a number of potential obstacles for the consumer or user of mobile marketing. Bulander et al. (2005) point out that privacy concerns especially might negatively impact location-based advertisement or services. The increasing number of unwanted marketing messages, both real and fraudulent, also called spam, has the potential to diminish the overall effectiveness and credibility of marketing communication sent via the mobile medium. In the first comprehensive study of its kind on the issue of spam, Brodt (2005) found a considerable amount of spam messages being sent to consumers around the world with the danger being that an increase of spam

messages ultimately decreases the effectiveness of “legitimate” marketing messages sent through the mobile medium.

However, two obstacles in the mobile marketing context, costs and the domination of the mobile value chain by a few dominant players, are diminishing according to Friedrich et al. (2009). As employing the mobile medium becomes increasingly less risky and more affordable, mobile marketing is becoming feasible even for non-specialists who want to use mobile marketing on a smaller scale and scope. This should prove encouraging for smaller players, such as physicians in private practice.

### **2.3 Mobile Customer Relationship Management (mCRM)**

In the quest to build and maintain long-term and profitable relationships with customers, organizations are discovering that the mobile medium represents a new, and in many regards unique, platform (Sinisalo et al., 2006). As customers increasingly expect to be able to interact with organizations using different communication channels, Sinisalo et al. (2007) argue that organizations should integrate the mobile channel into their overall customer relationship program while taking advantage of the unique characteristics the medium provides. As the uppermost purpose of CRM is the ability to communicate with customers on an individual basis, the mobile medium represents an appealing additional channel that can complement the existing communication channels (Camponovo et al., 2005).

Liljander, Polsa and Forsberg (2007) defined mobile CRM as “customer relationship management of any kind including interactive communication between an organization and a customer using a mobile device”. A broader definition of mCRM is offered by Inside CRM (2011): “Mobile CRM (mCRM) is a business strategy used for integrated management of relationship with customers through mobile marketing, mobile sales force automation and mobile customer service.” In addition to describing mCRM as a strategic choice, the latter definition also addresses the two principal perceptions of customer relationship management described by Houy, Fettke and Loos (2010). The first

perception refers to the communication or dialogue with the consumer using SMS messages, mobile-optimized websites or mobile applications. The second refers to the mobile sales force and mobile field force automation in which the mobile medium plays a supporting role in the direct contact with clients. In this latter case, mobile technologies are used to retrieve or take orders, in order to provide cost efficiencies through the optimization of processes as well as to realize positive image effects apparent to the clients.

In the mCRM context, the mobile medium can take the role of a supplementary, complementary or substitute channel (Sinisalo et al., 2007). For example, mCRM could be considered a complement or supplement to eCRM, the web-centric approach to synchronizing across communication channels, business functions and audiences as discussed by Kennedy (2006). Independent of the communication channels used, Ngai (2005) claims that CRM makes sense for organizations of all sizes. The innate characteristics of mobile devices are considered to be conducive to the overall goal of CRM. Hsu and Lin (2008) present results of their empirical work that indicate that efficiency, convenience and personalization are the characteristics most desired by mobile customers, thus ultimately contributing to customer satisfaction through mCRM activities. In exploratory research of mCRM applications in Italy, Valsecchi, Renga and Rangone (2007) found that the benefits expected from the launch of mCRM include improvement of customer relationships and satisfaction, increase in the efficiency and effectiveness of a company's internal processes and an increase in revenue.

A relationship of any kind, whether between two individuals or a company and its customers, starts with acquiring a deep understanding of the other party. Likewise the prerequisite for any CRM activity is information (Verhoef et al., 2010). Whereas a retailer might collect customer information through the introduction of loyalty cards, physicians collect the most relevant information about their clients at the beginning of the relationship and update it with every visit. If the depth of communication between physicians and patients was to increase with the inclusion of feedback or information channels, such as that feasible through mobile systems, the quality of this information is bound to

increase. Again, the potential value of the mobile medium as an additional channel begins to emerge.

Mobile CRM tools range from simple SMS messages such as customer alerts and reminders to mobile applications, mobile-optimized web pages and mobile newsletters. The different mCRM tools and solutions are inherently characterized by various degrees of technological and administrative complexity. Whereas an airline might offer mobile check-in services or provide real-time flight information via a mobile app on a smart phone, a physician might simply use SMS messages to remind his patients to schedule a routine check-up. This aspect of mCRM is important, as marketers can choose mCRM solutions that are feasible for them to implement and control. The mobile medium provides for exactly these possibilities.

Khurana and Chaudhary (2010) examine the role of mobile messaging technology in promoting CRM and conclude that mobile messaging improves CRM and promotes customer loyalty. The authors write “as a CRM medium, mobile provides an extraordinary force of intimacy that no other medium is competent to do. It can be used as an integrated marketing effort to strengthen the brand and promote customer acquisition and loyalty.” Hsu and Lin (2008) place great importance on contextually valuable messages, those messages which take the specific context of the recipient into consideration and which can be sent to a mobile device. The notion that contextual marketing via mobile phone may allow the marketer to develop intimate relationships with customers is also supported by Lee and Jun (2007). They observe that “contextual perceived value” (CPV) is a key driver of customer satisfaction and suggest marketers can increase CPV by offering personalized messages that are contextually relevant to customers at the point of need. According to a study conducted by Khurana and Chaudhary (2010), respondents found that mobile messaging technology enhances customer experience, helps brand promotion, attracts new customers, promotes customer satisfaction as well as customer loyalty and provides for an enhanced relationship between firm and customer.

Analyzing mCRM from a technological viewpoint, Silberer and Schulz

(2010) find that local area technologies such as Bluetooth or wireless local networks (WLAN), while being limited in terms of data transmission range, have the advantage of being able to supply location-based, and thus contextual, mCRM services and information. This aspect is interesting for retailers as well as physicians in private practice. Where the context of the former might be the physical store, for the latter it could be the waiting room.

Data and information is important for marketing in general, and for any form of customer relationship management it is vital. A holistic framework for mCRM from a data-mining perspective is thus presented by Ranjan and Bhatnagar (2009), with the suggested benefits including improved marketing strategy, increased customer acquisition and increased cross- and up-selling performance. The authors identify three critical issues related to mCRM in this context: a customer care information center, data storage and data access systems, and mobile services and technology. Their work sheds light on the technological issues associated with implementing mCRM that represent a challenge for mobile marketers. As all these elements have a price tag, cost is often seen as one of the limitations to implementing mCRM (Hsu and Ling, 2008). Along this line of argument, the authors go on to point out that the implementation of mCRM carries certain challenges: "To operate a successful mCRM, a stable technological infrastructure is necessary. Therefore, mCRM is integrated to the existing customers and CRM activities so it is supported by the technological infrastructure of the mobile medium system." The eventual success of any mobile CRM effort is closely linked with customers' readiness to use existing mobile service (Liljander, Polsa and Forsberg, 2007).

For the discussion of mobile marketing in the physician in private practice context, we consider mCRM pertaining to mobile marketing communications as elaborated by Leppäniemi and Karjaluoto (2008).

## **2.4 Adoption, Acceptance and Rejection in the Mobile Marketing Context**

There has been a considerable amount of academic research on the topic of adoption and acceptance of new technologies in general, or mobile



technologies in particular. In the field of information systems (IS), researchers have attempted to determine the factors that enable the adoption of new technologies (Cenfetelli and Schwarz, 2011). Academic researchers focusing on this particular field have based their work on a number of approaches. The most prominent theories and models that have found application, either individually or in combination, are the Technology Acceptance Model (TAM) (Davis, 1989) and its extension TAM 2 (Venkatesh and Davis, 2000), the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003), Roger's (1983) Diffusion of Innovations Theory, and the Theory of Reasoned Action (TRA) developed by Fishbein and Ajzen (1975).

The Diffusion of Innovations theory introduced by Rogers (2003) focuses on perceptions of the specific characteristics that affect the adoption of an innovation. Rogers defines adoption as the "decision to make full use of an innovation". The concepts of "intention for use" and "actual use" are considered dependent variables in this model. In broad terms, Rogers' attribute framework suggests that if a potential adopter holds positive perceptions of the combined innovation attributes, then they will be more likely to adopt, or accept, the innovation.

The Technology Acceptance Model (TAM) is the most widely applied model for user acceptance and usage (Vantanparast, 2010). In this model perceived usefulness (the perception that using a new technology will increase his or her job performance) and ease of use (the expectation that a new system will be easy to use) form a user's attitude towards technology and lead to the intention to use a technology. "Basically, people are more likely to use a system that they believe will help them perform better. But, even if a system is believed to be useful by an individual, if the system is too difficult to use, the potential of enhanced performance benefits to be derived from the system are outweighed by the effort required to use it" (Vantanparast, 2010). The TAM2 model of Venkatesh and Davis (2000) builds on TAM to explain people's intention to use mobile services, by including subjective norms in the analysis. Their model suggests that perceived usefulness and ease of use, as well as subjective norms, are important drivers of usage intentions of, in this case, mobile

technologies or services. Based on their study of different theoretical models used in this context, Venkatesh et al. (2003) proposed The Unified Theory of Acceptance and Use of Technology (UTAUT). The proposition of this theory is that the intention of people to use a certain information technology can be determined by three antecedents (performance expectancy, effort expectancy and social influences) and four moderators (age, gender, experience and voluntariness). Their research focuses on the factors that contribute to the adoption and use of new technologies, particularly from an Information System perspective. Another stream of research has focused on discovering the reasons for technology rejection. Cenfetelli and Schwarz (2010) emphasize the need to understand why users reject technology, pointing out that inhibitors may go beyond mere opposites of enablers: “A focus on only positive antecedents, as is often taken in technology acceptance research, may lead to an incomplete set of factors.” The authors refer to the fact that while it may be plausible to see the lack of perceived usefulness, the antipole of perceived usefulness, as an inhibitor, there are likely additional and independent barriers that merit investigation. While academic research might attempt to answer the question why individuals choose to use a certain technology, they might also ask why they do not.

In an early study, Venkatesh and Brown (2001) found that a household’s decision not to purchase a PC was influenced by barriers of rapid change, high cost and lack of knowledge. For the banking industry, the emergence and rapid proliferation of mobile devices and technologies has spurred the development of mobile banking services. Whereas a number of transaction-based (e.g. fund transfers, bill payments) and non-transaction-based activities (e.g. account balance inquiry) have become available through mobile devices and mobile applications, these mobile services are used less than expected (Kleijnen, Ruyter and Wetzels, 2007). Investigating the adoption barriers to mobile banking services in Brazil, Cruz et al (2010) found that high costs (economic barriers), the lack of relative advantage, perceived risk and the perceived unsuitability of the mobile device to be the main deterrents to mobile banking. In research the terms “barriers” and “inhibitors” are often used interchangeably, both terms referring to factors impeding the use of new technologies, in this

case mobile technologies and devices and the acceptance of services delivered via these new technologies.

Focusing on the retail environment, Shankar et al. (2010) elaborate the key factors that enable or hinder greater mobile usage, pertaining to both retailers and consumers. The authors posit that a number of enabling factors have a positive effect on perceived usefulness, including networking, the increasing range of mobile applications, declining costs, more user-friendly applications and interfaces of mobile devices and trust towards retailers and mobile technologies. The authors identify the lack of information by retail managers about mobile marketing opportunities in the retail context and mobile technologies in general as inhibitors of mobile marketing adoption. This lack of information by the initiator of mobile marketing maybe overcome by the provision of such by the corresponding stakeholder groups, such as the mobile service provider, mobile application developers or even the customers themselves. The importance of economic barriers, which may be conceived as the cost of purchasing a mobile device and cost of service on the side of the consumers, or personnel costs resulting from the implementation of mobile marketing activities on the side of the firm, are also generally associated with the adoption or rejection of new technologies. According to Roger's (2003) diffusion of innovation theory, during the initial phase of the innovation process, information and utility depiction play a crucial role in reducing consumer resistance.

Focusing their investigation on perceived obstacles to the adoption of mobile banking services among Brazilian Internet users, Cruz et al. (2010) identified the perceptions of cost, low perceived relative advantage and complexity as the main reasons behind the reluctance to use these services. These barriers to adoption focused on the customer side, not the company side. The authors review innovation adoption attributes as exhibited in table 2.3 below.

Barriers / attributes	Authors and results
Lack of Information	Cruz et al. (2010) (+), Rogers (2003), Shankar et al. (2010)
Complexity	Davis et al. (1989) (+); Davis (1989) (+); Wan, Luk and Chow (2005) (+); Venkatesh and Davis (2000) (+); Pikkarainen et al. (2004) (+); Lee et al. (2003) (-)
Lack of relative advantage	Davis et al. (1989) (+); Davis (1989) (+); Venkatesh and Davis (2000) (+); Pikkarainen et al. (2004) (+)
Cost	Rogers (2003); Meuter et al. (2005) (+); Laforet and Xyaoyan (2005) (-)
Perceived risk	Wan et al. (2005) (-); Lee et al. (2003) (-) Meuter et al. (2005) (-); Pikkarainen et al. (2004) (-); Brown et al. (2003)
Unsuitable device	Lee et al. (2003) (-); Laukkanen (2007); Cruz et al. (2009) (-)

Table 2.3: Innovation adoption attributes. Modified from Cruz et al, (2010)

Notes: (+) Positive relationship between behavior/intention (use/adopt) and the attribute; (-) negative relationship between behavior/intention (use/adopt) and the attribute; (ns) relationship not significant between behavior/intention (use/adopt) and the attribute. When no sign is indicated it means the work is exclusively theoretical.

The attribute of lack relative advantage refers to the antipole of relative advantage, a term coined by Gerrard and Cunningham (2003), implying that diffusion of new technologies is influenced by the degree to which a new technology is perceived as being better than the existing technologies. Relative advantage thus can be seen to correspond with Davis's (1989) concept of perceived usefulness. Whereas cost is a self-explanatory concept, the perceived risk dimension refers to the uncertainty that the utility of the innovation is secure. In the case of mobile banking services, this uncertainty may arise from attributes such as functionality and security of data transmissions (Cruz et al., 2010). In a mobile marketing context, focusing on physicians in private practice, perceived risk may stem from the transmission, use or misuse of confidential information, similar to the perceived factors associated with email communication to patients discussed by Bard (2002). The dimension of unsuitable device refers to the perception customers have that their devices are not suitable for performing a certain task. In the context of the banking industry, Cruz et al. (2010) for instance cite the small screen of a

mobile phone to be perceived to be unsuitable for mobile banking activities by consumers.

The impact of demographics on adoption behavior has been a subject of interest within the context of electronic services. Research by Li, Glass and Records (2007) found no significant differences between men and women in their adoption rates of mobile commerce, with respondents' perceptions of price, ease of use, and usefulness being significant drivers of mobile service adoption. However, the authors note: "Male respondents used more communication, information, and transaction services than females suggesting that males move through the adoption stages at a more rapid rate than females do." In a mobile banking context, research of Mattila, Karjaluoto and Pento (2003) suggests that Internet banking customers over the age of 50 present a significantly higher perceived difficulty in using computers and a higher level of perceived insecurity compared to general banking customers. The same pattern was noted by Laukkanen, et al. (2007), who found that older internet banking customers expressed significantly higher concerns than younger ones regarding mobile banking attributes, namely perceived risk, complexity in mobile handling and device issues such as battery life or PIN codes.

Research has revealed that instrumental characteristics, as specified in extrinsic or goal-directed behavior, apply to men more than to women (Davis, et al., 1989; Cruz, et al., 2010). Men appear more task-oriented than women (Gentile, Spilera and Noci, 2007) and, overall possess more extrinsic and instrumental motives than women (Cruz, et al., 2010; Davis, et al. 1989; Nysveen, Perdersen and Thorbjørnsen, 2005).

As stated before, lack of relative advantage is assumed to be, to some extent, the opposite of perceived usefulness. Following this reasoning, lack of relative advantage will be greater, proportionally, among the female population.

Garbarino and Strahilevitz (2004) argue that women perceive more risk in online purchases compared to men. Venkatesh and Morris (2000) found support for their arguments that women registered lower levels of self-efficacy

and higher anxiety than men when dealing with electronic innovations. Accordingly, risk perceptions and mobile banking rollout complexity are expected to be higher among females. Household income and education were also found to have a significant effect on the adoption of the internet as a banking channel (Karjaluoto, Matila and Pento, 2002; Mattila, Karjaluoto and Pento, 2003). Higher education may lead to a greater understanding and ability regarding self-service technologies (Meuter, et al., 2005), and thus to lower complexity perceptions.

However, the success of the mobile medium as a marketing channel is not determined by the adoption of mobile devices alone. It also hinges on the perceptions of mobile marketing in general, and of mobile marketing messages by the intended target audience in particular. Academic research in this field highlights the differences that exist within the potential mobile marketing audience and thus has to be taken into consideration.

Investigating the factors that induce consumers to accept the mobile phone as a means of communicating promotional content, Bauer, et al. (2005) found entertainment and information value to be the strongest drivers of the acceptance of the mobile phone as an innovative medium for advertising content communication. At the same time, the results of their empirical research indicate that the perception of risk, primarily stemming from the fear of the misuse of data and the reception of unwanted mobile marketing messages, negatively influences attitudes toward mobile marketing. The resulting idea of requiring consumers to opt in before any marketer can send promotional messages to their phones has been taken up in the Best Practices for US Mobile marketers by the Mobile Marketing Association (2011). The guideline states: "Content providers must obtain opt-in approval from subscribers before sending them any SMS or MMS messages or other content from a short code." The importance of consumer opt-in is supported by a number of other researchers such as Barnes and Scornavacca (2004), Bauer, et al. (2005), and Leppäniemi and Karjaluoto (2005). Barwise and Strong (2002) found that incentives being offered to consumers enticed them to receive advertisements sent via SMS to their mobile phones. Incentives in this context could include

free phone minutes or a certain quantity of free SMS messages. Merisavo, et al. (2007) examined the drivers of SMS advertising acceptance among Finnish consumers, finding that the usefulness and context of the message were significantly associated with consumer acceptance. Research of Yang and Jolly (2008) found the constructs of “perceived usefulness” constituting a critical motivator for baby-boomers to adopt mobile data services. Lower levels of perceived “ease of use” was found to constitute a detriment to adoption in the study. The perceptions of “relative advantage” and “compatibility” were found to be of significant importance in a study conducted by Roach (2008) focusing on the acceptance and adoption of marketing messages sent via the mobile phone.

Examining the drivers of consumers’ acceptance of SMS-based mobile advertising, Leppäniemi (2008) found perceived utility and the utilization of contextual information to be the strongest positive drivers of consumer acceptance. In terms of the utility of the mobile medium, the author states that “using the mobile channel as an information channel might tie the customers even more closely to the firm, and by doing so, make them less receptive to other advertising, such as mass media advertising from competing firms and brands. With respect to the use of context in mobile marketing campaigns, successful campaigns have been incorporated within the context of a specific event like a concert or a game.” Along the same line of thought, Heinonen and Strandvik (2007) state: “the marketer must improve the value consumers receive from the message, as well as how, when and where the marketing communication is delivered to the consumer.”

In a study conducted by Jayawardhena, et al. (2009) in Finland, Germany and the United Kingdom, institutional trust was found to be the most important factor affecting a consumer’s decision to participate in mobile marketing. This implies that people are more inclined to accept mobile marketing communication if it comes from a trusted source, an important consideration also for the physician-patient communication context.

According to Peters, Amato and Hollenbeck (2007), most consumers do not need or want a service that provides general information but rather prefer

relevant information. Thus marketers are compelled to consider the relevance of the information to the receiver as well as demographic and behavioral variables.

## **2.5 Conclusion**

Mobile marketing has been the focus of a growing amount of academic research. Given the multifaceted nature of the phenomenon, it has attracted researchers from different specializations proving a wide range of interesting insights. The academic and practical knowledge generated highlights the interesting opportunities resulting from the rapid development, capabilities and prevalence of mobile technologies and devices for marketers of all types and sizes. Understanding the opportunities and challenges resulting from the inclusion of the mobile channel into an organization's marketing communication will undoubtedly attract a significant amount of academic research in the future.

The focus will now shift towards physicians in private practice. While insights from academic research on the general topic of mobile marketing and related sub-topics are important, a number of additional insights are needed in order to develop the notion of physicians in private practice as mobile marketers.



## **CHAPTER 3**

### **THE PHYSICIAN IN PRIVATE PRACTICE AS MOBILE MARKETER**

#### **3.1 Introduction**

Physicians are a professional group not usually associated with marketing concepts developed for and used by profit-maximizing companies. The traditional view of a physician is that of a professional whose sole purpose is to prevent or heal diseases of patients. The positive health outcomes for a physician's patients are at the core of the medical profession. Physicians generally are not expert marketers and are not expected to be, having studied medicine instead of business. Likewise, very few people would trustingly accept the treatment prescription for a heart condition from an economist. The point here, however, is that in the mobile era physicians can be both good physicians and good marketers. Using mobile devices and technology, physicians can not only facilitate their access to medical knowledge and education via mobile websites, mobile apps, mobile references and medical studies, but can also enhance their overall communication process with existing and potential patients. Put differently, elements contained in marketing communication, namely customer relationship management and advertising and promotion are inherent in the operations of a private medical practice.

A physician in private practice, a physician working out of his or her own practice, has to cover the costs of operating that practice, including rent, salaries to employees, insurance, acquisition and maintenance of medical equipment among other expenses. A recent report by First Research (2011) finds that while demand for physician services is driven by population growth and a change of demographics, the profitability of individual practices depends on the reputation and expertise of the physician and staff. As physicians usually have several direct competitors in the immediate geographic area, practices compete effectively by providing specialized skills and good customer service. Thus physicians in private practice operate under economic prerequisites, though their primary objective remains contributing to patients' health by providing quality service. However, according to Weinrauch (1982) physicians

are lacking business training and therefore need help in identifying aspects of marketing that will enable them to provide good patient care while providing a reasonable return for their services. It seems appropriate to note that mobile marketing is likely to mean different things to different types of organizations or professional groups and presents different opportunities and challenges depending on the organizational setting. Physicians as (mobile) marketers differ from other marketers in a number of ways that should be addressed.

### **3.2 Physicians and Marketing**

As previously mentioned, physicians are the targets of significant marketing efforts, primarily by the pharmaceutical industry of which they are the primary clients. However, to view physicians as marketers themselves raises a number of interesting issues. While physicians are generally not regarded as expert marketers, when working out of a private medical practice they do engage, either willingly or unwillingly, consciously or unconsciously, in a number of marketing activities, particularly customer relationship management activities and advertising.

Physicians have been found to have serious misconceptions about marketing (Porter 2000), including the equation of marketing with advertising and the perception that marketing activities represent a waste of revenue. Physicians can successfully use the fundamental service marketing principles employed by other service industries to win patient satisfaction and loyalty and remain competitive in today's market economy (e.g. West and Blankenship 1975; Van Doren and Blank, 1992; Letter, 2005). Therefore, the marketing of healthcare services has become fundamental to the financial success of physician practices and healthcare organizations of all sizes (Corbin, Kelly and Schwartz, 2001). Gray and Christiansen (2009) claim that medical practices cannot ignore electronic marketing channels in their attempt to reach consumers with information about their services, or to engage in customer retention activities.

The quality, form and timeliness of communication provided by the physician, the ease of making or cancelling appointments, the availability of practice information on the increasingly mobile internet, the ability to send or receive information to or from or patients, the provision of educational health-related information – all of these activities form part of marketing communications in general, and CRM in particular. CRM plays an important role in a healthcare context because competitive pressures and cost containment require healthcare service providers to be competitive in delivering customer satisfaction and retaining patients they serve, as well as increasing referrals to generate new customers (e.g Hausman, 2004).

The presence of a practice's information on websites that are optimized for mobile devices, the availability of mobile practice apps that can be downloaded onto a patient's mobile phone, the listing of a medical practice in mobile search pages – all of these activities pertain to marketing, in this case advertising and promotion. The implied value of these activities relies on the notion that they make it easier for patients or potential patients to access important practice information from their mobile devices at any time and any location.

From an economic perspective, a physician's practice is limited in the number of customers, in this case patients, it can actually care for. There is a ceiling to the number of patients a physician can actually treat on a daily, weekly or monthly basis. This is different from most other types of economic entities for which the standard marketing theories, models and practices have been developed. Given the circumstances, it is clear that pure customer acquisition cannot be the primary objective for physicians. On the contrary, obtaining too many patients would be counterproductive, as it would most likely negatively impact patient scheduling, face time, waiting times and administrative effort, eventually resulting in lower customer satisfaction and possibly, and very importantly, reduced effectiveness in terms of desired health outcomes.

Physicians as mobile marketers also face significant limitations in terms of pricing in most health care systems. How much physicians can charge for a

specific service is generally limited by laws and regulations. For this reason, many marketing differentiation strategies do not seem feasible. For example, to charge a premium for services because of a fancy location and state-of-the-art installations is possible for a retailer, but not for physicians in most European healthcare systems. However, additional income may be generated by offering patients additional services the patients were not originally contemplating or even aware of. In many countries, physicians may be paid different fees by different patients. In Germany, there is a fee-for-service system in which different fees may be charged by the physician depending if the patients are insured through public or private health insurance (Laugesen and Glied, 2011). In the German market, where the healthcare system is segmented in a private and social insurance market, healthcare coverage is provided through a mix of social health insurance for about 90% of the population and primary private health insurance for eligible individuals who opt out of the system (Brandt, 2008). A research study conducted by Obermann and Müller (2011) in Germany found that while only about 10% of patients are insured privately, they contribute approximately 20% to physicians' revenues.

In contrast to a global consumer products company that attempts to segment and target a vast universe of existing or potential consumers, a physician in private practice is facing a somewhat modified situation. The number of existing patients is considerably smaller. Also, the physician already knows his or her patients, at least to a certain degree, with the patient record and personal experiences providing the basis of this knowledge. It seems fair to claim that an in-depth knowledge, primarily of essential facts critical to the physician-patient encounter, but also of those of a more personal nature, is a key prerequisite for personalized communication between service-provider and client. In the case of physicians, however, a potential complication is the sheer quantity of patients they are often responsible for and the patient encounters they have to manage and document. In Germany, for example, an average physician sees 45 patients a day, making 10,735 patient contacts per year (Von Borstel, 2010). The abundance of vital, and not so vital, information required and generated as a result of patient encounters, and the need for subsequent access, represents a substantial challenge to physicians. Although the trend

towards digitalization of patient information, such as electronic patient files, has started to take hold in physician's offices, the opportunities presented by mobile devices and technologies are poised to have a significant impact in the future. From the practical viewpoint of a physician as mobile marketer, possible segmentation approaches are likely to differ from those of other marketers. For a physician's mCRM efforts, communication should be above all personalized in order to maximize the benefit the mobile device offers. Second, all communication should be on an opt-in basis as established by the Mobile Marketing Association. In general, a mobile application or service can be offered for one particular user group or customer segment, for several groups, or for all of them. Sometimes it is provided for several user groups or customer segments with different parameter values (Schierholz, Kolbe and Bremer, 2007). The segmentation bases employed will also vary with the objective a physician pursues. According to Warren, Loudon and Stevens (1990), present and potential patients may be segmented on the basis of usage levels and benefits desired, among other dimensions.

Given the different types of information the physician might want to provide to his or her patients (e.g., general educational vs. personalized, condition-related), different types of information will be distributed by different mobile channels. Also, as the level of complexity rises with the level of segmentation, factors such as the organizational and technical capacity of the physician's office will be a deciding factor. But in order to strengthen the relationship with the patients, leading to a higher degree of loyalty and satisfaction, the personalization of outgoing communication from the physician's perspective is crucial. Possible segmentation and targeting categories to be applied by physicians are elaborated in table 3.1.

If medicine were considered a common industry with corresponding rules, marketing could be expected to play a prominent role, given the large number of providers without any specific competitive advantage (Obermann and Müller, 2011). But this is not necessarily the case, at least not yet.

Category	Description
“Need-based”	Personalized information is provided based on the specific medical condition of the patient and consequent information need. Ideally combined with other segmentation criteria, such as type of mobile device and format preference expressed by the patient. Potential mobile channels: SMS, (mobile) email, or practice homepage optimized for mobile devices.
“General Device”	In order to customize their messaging, physicians could take the type of mobile phone owned by the patients as the basis for segmentation. The rationale here is that different message types, such as MMS messages or videos, depend on the technological capabilities and design of the mobile device. The lowest common denominator would be the SMS message, as this form of mobile communication is really independent of phone type, operating system or design. However, a resulting lack of personalized communication will limit communication to general information.
“Basic care / Do-it-yourself”	General information with a wide educational appeal and related to general health, lifestyle, nutrition, education or simple entertainment is provided in the form of newsletters, announcements or other formats, via a number of mobile channels including local wireless network in the physician’s medical practice. Patients consequently select a) the mobile channel or device and b) the information itself that is of interest to them. Personalization, a key strength of the mobile medium and principal idea of mCRM activities, is not possible. However, it is suitable for information of general interest as provided in the waiting-room area of a physician’s practice.
“Insurance-Based”:	Some specific type of communication can conceivably be based on the insurance type of the patients (public vs. private insurance) for up-selling efforts. Based on the insurance type of the patients, some conclusions regarding potential up-selling opportunities can be made.

Table 3.1: Potential segmentation criteria and activities. Elaborated by author.

### 3.3 Trust, Satisfaction and Loyalty in the Physician-Patient Context

The issues of trust, satisfaction and loyalty surface in a number of contexts related to mobile marketing and constitute core concepts in marketing as a whole. In conceptualizing the physician as mobile marketer, specific issues related to patients’ trust in physicians, patient satisfaction and loyalty merit special consideration. As will be illustrated, these concepts are highly

interrelated and represent not only critical elements for the physician-patient relationship, but also aid in making the case for the physician as mobile marketer in regards to communication with his or her existing or potential patients.

In general terms, patient trust can be conceptualized as having two interrelated elements, interpersonal trust and social trust. The former pertains to a generalized trust in a particular physician and the latter to a generalized trust towards the medical profession (Fugelli, 2001). Extending on previous research which established that patients' trust in their physicians is essential to the therapeutic relationship between physicians and patients, and relevant to patient satisfaction and adherence to treatment, Tarrant, Stokes and Baker (2003) found through survey research in the UK that most patients (76%) displayed high levels of trust in their general physicians. The study also revealed that communication, interpersonal care, and the physician's knowledge of the patient were most strongly associated with trust of patients towards their physicians. Pearson and Raeke (2000) present a synopsis of specific features of patient, physician, and healthcare system characteristics that have been found to influence trust. In their analysis of existing research on the topic, the authors find that patients base their trust towards physicians on competence, compassion, privacy and confidentiality, reliability, dependability, and communication. In terms of the relationship between health outcomes and trust, the authors state: "Trust is considered to be an important outcome in its own right. Theoretically, patient trust should serve to reinforce the functioning of the clinical relationship as a health partnership, thereby increasing the probability of patient satisfaction, treatment adherence, and improved health status, while decreasing the likelihood of leaving the physician's practice or withdrawing from a health plan." A higher degree of patient trust has also been linked to intended or reported adherence to treatment recommendations of their physicians (Thom, Hall and Pawlson, 2004).

Referring to a survey of nearly 16,000 people conducted over seven years and published in the New England Journal of Medicine, a US News and World Report article (Thompson, 2010) reports that trust in physicians has

increased with the ascent of the internet, while, by a large margin, people perform their own research and then take that information to their physicians for discussion. This result might appear somewhat surprising. As discussed previously, the proliferation of medical and healthcare information is breaking down the information monopoly of physicians and causing a fundamental shift in the physician-patient relationship. However, as this study suggests, the level of trust in physicians has actually increased as a result and thus it can be deemed conducive to achieving patient satisfaction and loyalty.

An empirical study conducted by Ouschan, Sweeney and Johnson (2006) found that empowerment in the context of consultations about chronic illness conditions has a positive impact on patient trust in and commitment to their physician. More specifically, the study indicates that physician-based attributes (e.g., support provided to the patient) and patient based-attributes (e.g., the effort a patient puts into contributing to medical encounters and managing the chronic illness condition) both play an important role in enhancing patient commitment to the physician. This commitment by the patient to his or her physician translates into loyalty, an extremely important aspect of the physician-patient relationship. While different definitions of loyalty in the physician-patient context exist, in this case it refers to the commitment of patients to their physicians, which results in a reduction of patient churn, higher rates of recommendation, and increased readiness to use additional services, among other benefits (MacStravic, 1994).

As discussed, a number of different factors contribute to patient satisfaction, but the proverbial “holy grail” is better physician-patient communication (Vukmir, 2006). A model presented by Tucker (2002) identifies communication-related variables as key factors, such as information provided over the phone, advice to avoid illness and explanations of procedures. In addition to these variables, Tucker’s model includes the ease of making appointments by phone, office waiting times, time between appointment and visit, and ultimately health outcomes as influencing factors towards patient satisfaction. These are variables over which physicians can take, at least to some degree, direct control. Other influencing factors, such as patient-specific



health situations, socio-demographic variables or characteristics of the health system in general, are outside of a physician's control and will vary with the specialization of the physician. It therefore makes sense for physicians to contemplate which controllable factors of this equation can be improved with the inclusion of mobile communication technology in their practice. The inevitable answer is all of them.

From an economic perspective, the issues of patient satisfaction and loyalty are also related to another issue that is not usually considered in a physician context: customer lifetime value. Citing Winston (1988), MacStravic (1994) states: "Each patient may be considered to represent a significant lifetime value based on expected annual visit volume and revenue per visit times years of loyalty." Given that physicians do compete in the marketplace for their patients in most healthcare systems, the validity of this statement is clear. In many healthcare systems, such as Germany's, the revenue per visit can potentially be increased by performing additional services or by using enhanced materials for certain procedures that require an additional payment by the patients themselves, as they are not covered by the insurer. Loyal patients have also been linked to greater profitability, as they are easier to serve more efficiently (MacStravic, 1994), and have been found more likely to complain and seek resolution of their complaints, rather than leaving their physician (Czepiel, 1987).

Related to trust, patient satisfaction, and loyalty is the rising importance of consumer recommendations. Consumer recommendations, either by word-of-mouth (WOM), in person or via social networks, have been recognized to be of great importance for marketers of goods and services, including physicians. Palka, Pousttchi and Wiedemann (2009) define "word-of-mouth" as the oral, person-to-person communication between a recipient and a communicator, which the recipient perceives as a non-commercial message. Word-of-mouth is especially important for service providers whose offerings are to a large degree intangible, and experience- or credence-based (Ng, David and Dagger, 2011). Cooley and Madupu (2009) claim that while the Internet has opened up another potential source of obtaining health care services-related information, health

care services being credence-dominant, consumers have a preference for personal sources of information such as WOM from known people.

Related to the concept of WOM are the customer-to-customer (C2C) interactions discussed by Libai, et al. (2010). Satisfied patients are likely to engage in word-of-mouth marketing on behalf of their physicians if satisfied, and against their physicians if dissatisfied. Ng, David and Dagger (2011) found that word-of-mouth recommendation behavior is driven by functional relationship qualities (the process of core service delivery and the interactions that take place between a customer and a service provider) and relationship qualities (customer's positive feelings towards a provider and their relationship in terms of trust and commitment and overall satisfaction). Along the same lines, it has been argued that patients can assist in bringing in or "recruiting" other patients when they are satisfied with the services provided by their physician, or tell as many people about their dissatisfaction (MacStravic, 1994). Today, patients can connect, communicate, and exchange opinions and advice on an unprecedented scale and scope. In the mobile era, mobile devices, especially internet-enabled smart phones, represent a valuable platform for word-of-mouth marketing (Bauer et al., 2005).

In summary, increased patient satisfaction, loyalty and trust are conducive to both the economic and competitive factors leading to a successful practice, while simultaneously achieving the physician's primary professional objective of helping to prevent or cure medical conditions. When considering the opportunities that mobile technology provides, it seems plausible to suggest that using the mobile channel could impact the above-mentioned elements, either directly or indirectly.

### **3.4 Catalysts of Change**

As marketers in all industries are discovering the mobile channel, it could be suggested that physicians will do the same. The impetus for physicians to do this might be reinforced by a number of macro drivers we shall call catalysts for change. The three primary macro drivers are the rise of mobile technology in

the healthcare sector, the changing physician-patient relationship, and rising adoption rates of mobile devices and services by both physicians and their patients.

The first driver (Macro Driver #1) is related to the rise of mobile technology in the healthcare sector. The emergence of mobile technologies and devices has given rise to the wider topic of mobile health (m-health), which has been defined as the “emerging mobile communications and network technologies for healthcare” (Istepanian and Lacal, 2003) or the medical and public health practice supported by mobile devices, such as mobile phones, patient monitoring devices, personal digital assistants (PDAs), and other wireless devices (World Health Organization, 2011). Mobile technologies and devices could potentially address many of the healthcare challenges and demands of the 21st century (Goldberg and Wickramasinghe, 2003) and become an integral part of healthcare practice, management and processes (Han et al., 2006). Wireless handheld devices and systems have already started to change the ways of medical practice (Jokela et al., 2009). Mobile technologies are finding applications in both the administrative and the treatment side of healthcare. The penetration of mobile technologies in the healthcare arena is bound to gain momentum, and as a consequence more physicians will come into contact with that medium; it seems plausible to expect that this development would serve as an impetus for physicians to consider including such technologies into their communication mix with current or future patients.

Also, it is estimated that there are over 40,000 mobile health apps across multiple mobile platforms contributing to the \$718 million global industry, according to Research2Guidance, an international market research firm and reported by Cohn (2012). As discussed by Liu, et al. (2011), categories of physician-facing mobile medical apps include drug or medical information databases, medical information reference decision support, educational tools, tracking tools and medical calculators.

The second driver (Macro Driver #2) relates to the changing physician-patient relationship. In the advent of the information revolution, expectations of patients are changing. Changes in information technology, first the Internet and now the mobile medium, are strongly impacting the way physicians interact and communicate with patients, and patients with physicians (Johnson and Ramaprasad, 2000). Patients increasingly expect to receive more information from their physicians and at the same time to be able to participate in the communication process. The traditional one-way communication from physician to patient is thus to a dialogue. The paternalistic, power-dependency model of the physician-patient encounter is changing, particularly through the Internet-driven information revolution (Laing, Hogg and Winkelman, 2004). This change in the physician-patient relationship may entail changes in the amount and type of information flow and in the level of reciprocity in the relationship (Camacho, Landsman and Stremersch, 2010). It may also entail a change in the communication channels used by physicians. A recent study conducted by medTera found that a large majority of patients felt a lack of information and communication between them and their physicians (Comer, 2010), thus echoing similar claims by other authors (e.g., Epstein, et al., 2008). Patients are increasingly looking for and finding relevant medical information on the Internet (Cooley and Madupu, 2009). Manhattan Research (2010) reports that in the U.S. alone, 99 million adults were found to be “e-empowered” consumers, having either challenged their physician’s treatment or diagnosis, asked their physician to change their treatment, discussed information found online at a doctor’s appointment, used the Internet instead of going to the doctor, or made a healthcare decision for themselves. The Internet is now the top source of health information for adults in the U.S., outranking their own physicians (Capgemini Consulting, 2011). The access to this information is also facilitated by the rapidly rising use of smart phones, which more and more consumers use to go online. In order to heed the demands of “empowered” patients, physicians in private practice might be motivated to increasingly employ the mobile marketing channel into their communication mix.

At the same time, patients are increasingly voicing their opinion about their physicians on rating portals such as HealthGrades.com in the U.S. or

Weisse-liste.de in Germany, on patient web communities, or on social media platforms. Consequently, due to the ubiquitous presence of digital media, patients increasingly have the power to significantly affect their physician's image and reputation. In the case of Weisse-liste.de, 37 million insured patients of three major health insurers can rate their physicians along the dimensions of "practice and personnel", "physician communication", "treatment" and "general impression" (Gras, 2011). Even though the impact of these rating portals has not been thoroughly analyzed, they constitute a potential explanation to why patient satisfaction is becoming increasingly important to physicians. Just as consumers have become "transparent" due to the availability of purchasing and other data, physicians are equally becoming "transparent" due to the increasing availability of information about their practices and the perceived quality of their services. It would seem reasonable that more transparency requires physicians to better manage their reputation than in the pre-digital and pre-mobile era, and mobile technology could contribute to this endeavor.

The third and final driver (Macro Driver #3) relates to the adoption of mobile devices and services. Physicians have turned into avid adopters of mobile technologies for private and professional purposes. As a professional group, physicians in general have been avid adopters of mobile technologies for private and professional purposes (Tyer, 2012). According to a recent study among physicians in the U.S, 59% were found to use iPhones; 29% to use iPads and 20% to use Android smartphones. 14% of physicians reported using Blackberry devices (Razorfish Healthware, 2012). Physicians' adoption rates of tablet computers, most prominently the iPad, are soaring as well in Europe with 26 % of practicing physicians in Germany, France, Spain, Italy and the UK owning such a device (Tyer, 2012). Mobile consumption of medical news is increasing rapidly. However, there are significant differences in mobile consumption of medical news between various medical specialties (Healthcare IT News, 2011). According to a recent study of U.S. physicians by the Massachusetts Medical Society, American College of Rheumatology, and ICF Ironworks (Fortin, Johnson and Turner Reid, 2012), tasks for which mobile devices are used as much or more than desktop devices include reading news, articles, or abstracts, consulting a drug reference database, checking clinical

references, looking up formulary information, receiving updates about new products, using a prescription dosage calculator, receiving appointment reminders, and accessing professional social networks.

Consumers, and thus current and potential patients, are also embracing mobile devices enthusiastically. The International Telecommunications Union (2011) estimates that the global penetration rate of mobile phones has reached 87% in the developed world and 79% in the developing world, with 45% of the world's population covered by a 3G mobile network required for fast mobile Internet access. In the U.S. and Western Europe, 90% of mobile subscribers own a mobile phone that can access the mobile web (comScore, 2011). It is estimated that by 2015, approximately 500 million people worldwide will be using mobile health applications via smart phones, out of a projected 1.4 billion smart phone owners (Murphy, 2010).

The presence of these key and self-reinforcing drivers should contribute to the increased inclusion of the mobile channel into the marketing communication of physicians in private practice.

### **3.5 Mobile Activities and Tools for Physicians in Private Practice**

As discussed, the rapid development and proliferation of mobile technologies is presenting marketers in different industries with a multitude of tools to pursue different marketing objectives. The fundamental premise is that the mobile channel can serve as a complementary, supplementary or additional communication channel to both mCRM and promotion activities, as proposed by Sinisalo, et al. (2007). Hence, private practice physicians may use mobile technologies and devices primarily to complement and supplement their marketing communication directed towards existing and potential patients. However, many mobile activities that may be feasible for a global consumer products company are likely to be out of scope and scale for a private physician's practice.

The discussion on feasible mobile activities and objectives that may be pursued by this professional group has to focus on what is realistic, not on what is theoretically possible within the mobile marketing universe. As emphasized by Sinisalo, et al. (2007), mobile marketers, in this case private practice physicians, must assess their marketing communication capabilities, which include human, technological, and financial resources among others, to ensure that they have the requisite resources to effectively execute the activities related to each of the communications tools and channels.

For instance, a mobile tablet computer, such as the Apple iPad, may complement or supplement information provided by the physician or the practice employees before and during the patient encounter. A practice's webpage, optimized for mobile devices, displaying information about services offered, practice hours, scheduling information, and providing direct email or scheduling options, may complement or supplement the information provided through the standard practice webpage or listing in a physician portal. A mobile practice app, which can be downloaded by existing or potential patients onto their mobile devices, may complement or even replace information provided through a host of other communication channels. Information on an existing practice webpage may be replaced by information provided on a webpage optimized for mobile devices. Patient surveys conducted on paper can be replaced with surveys conducted on a mobile device. There are countless opportunities for physicians to include mobile devices into the communication mix with existing and potential patients. An overview of feasible activities is provided in table 3.2.

In addition, mCRM efforts by physicians could benefit from the value of location-specific information. Location-specific information refers to a number of services such as advertising, notification, location and direction information (Bruner II and Kumar, 2007). The credo of effective marketing communication, providing "the right information to the right people at the right time and in the right place" can take on a very specific meaning in the physician-patient context, through provision of relevant information to patients in the waiting area of a physician's practice.

A review conducted by West (2012) of 25 studies on voice and text messaging interventions in care management found significant benefits. In examining research on medical reminders sent to 38,060 individuals, researchers documented improvements “in compliance with medicine taking, asthma symptoms, stress levels, smoking quit rates, and self efficacy. Process improvements were reported in lower failed appointments, quicker diagnosis and treatment, and improving teaching and training. Banderker and Van Belle (2009) point out that mobile technology is suitable for supporting the physician at the point of care or, in other words, in the encounter with the patient.

### **3.6 Mobile Marketing Objectives for Physicians in Private Practice**

Private practice physicians can, and often already do, pursue a number of marketing communication objectives, using a variety of mobile tools and devices that entail different levels of technological and practical complexity. In a physician-patient marketing communication context, possible objectives could be perceived to fall into patient-centered and practice-centered objectives. Patient-centered objectives of mobile marketing activities pertain to communication towards current and potential patients. Consequently, patient-centered mobile marketing objectives could be further divided into mobile Customer Relationship Management (mCRM) and mobile advertising and promotion.

As discussed before, mobile CRM can be defined as customer relationship management of any kind using a mobile device, including interactive communication between an organization and a customer (Liljander, Polsa and Forsberg, 2007; Hsu and Lin, 2008).



Category	Tool	Primary Mobile Channel/Device	Description
mCRM	Appointment reminders	SMS to mobile phone	Patients receive an SMS to their mobile phones to remind them of upcoming appointment.
mCRM	Appointment (re)scheduling	Mobile web, mobile app	Patients can (re)schedule appointments via physician's web page via mobile web or by using mobile app provided by physician.
mCRM	Medication adherence reminders	SMS to mobile phone, mobile web	Patients receive personalized SMS or email message reminding them to take their prescribed medication.
mCRM	Medication interaction alerts or reminders	SMS to mobile phone, mobile web	Patients taking a specific medication are sent reminders or alerts regarding potentially harmful interactions with other medication the patient might be taking. Also suited for medication recall notices from the manufacturer.
mCRM	Other alerts and reminders	SMS, email through mobile web	Patients receive message on their mobile devices, reminding them of necessary vaccinations, periodical routine check-ups, allergy alerts etc.
mCRM	Pre-consultation support	Mobile app, access to patient data via mobile device, mobile administrative solutions	Physician uses mobile device, mobile app or mobile administrative software to review patient data before the consultation.
mCRM	In-consultation support	Mobile web, mobile apps	Physician employs mobile device such as a mobile tablet device to look up information using the mobile web, a mobile app, sharing information with the patient in written or graphical form.
mCRM	Post-consultation support	Mobile supported physician web portal, patient portal, mobile app, SMS	Patients access online information provided by physicians on mobile webpage, physician or patient portal or receive documents as PDFs to their mobile devices. Physician uses mobile device to document encounter.
mCRM	General information provision/ patient education	Local WLAN. QR code scanning (in combination with traditional media)	On the physician's premises, specifically in the waiting room, patients receive or have access to general medical or condition-specific information on their mobile devices (Push or Pull). Information provided by physician and / or selected 3rd parties.
mCRM	Mobile feedback channel	SMS, email through mobile web, mobile physician or patient portal	Patients can send SMS or emails via mobile devices to physicians' offices or post comments or questions on their physician's patient portal.
mCRM	Mobile newsletters, blogs	SMS, email through mobile web, mobile physician or patient portal or via Bluetooth on premises	Patients receive physician or practice newsletters, blog updates or general physician or practice news on their mobile devices or via email.

mCRM	Patient satisfaction surveys	Online via mobile web, On-site via mobile tablet computer (ex. Ipad). Off-site via mobile physician or patient portal or via email via mobile web	Patients participate in customer satisfaction or other surveys using a mobile tablet computer provided by the physician or staff in the practice, access online surveys via their mobile phones while waiting in physician practice or from any other location.
mCRM	Mobile Payment Options	Mobile payment systems	Patients can make co-payments or payments for costs not covered by health insurance in physician's office using their mobile phones.
mCRM	Mobile community	Mobile web page	Patients can interact with each other, posting comments or questions to other patients on mobile physician or practice web page.
Advertising/ Promotion	Mobile advertising	Mobile web	Physician uses mobile advertising formats (e.g. banner ads) to advertise practice or services on relevant mobile webpages, ideally providing link to physician or practice webpage.
Advertising/ Promotion	Mobile search	Mobile (physician) search pages, directories	Physician lists practice and service information on specific mobile search portals.
Advertising/ Promotion	Viral marketing	SMS, mobile web	Physician's practice sends information to existing patients (in form of newsletters, blogs etc.) that may be passed on via a mobile device.

Table 3.2: Basic mobile activities for physicians in private practice. Elaborated by author.

Directed towards existing patients, mCRM objectives could include relationship building, image building or up-selling. The viability of these objectives seems to be supported by academic research. CRM activities by physicians make sense as satisfied patients return and may possibly ask for additional services or bring in new patients (Huber, 2010). Up-selling in this context could, for instance, refer to offering patients additional services which require an additional payment. An overview for the additional services that may be offered by a gynecologist in Germany can be found in the online IGEL directory ([www.igel-verzeichnis.de](http://www.igel-verzeichnis.de)). The listed services range in price from 5 to 220 Euros, and require additional payment directly by the patient.

As customers increasingly expect to be in a position to interact with organizations using different communication channels, Sinisalo, et al. (2007) argue that organizations should integrate the mobile channel into their overall

customer relationship program while taking advantage of the unique characteristics the medium provides. At the same time, the eventual success of any mobile CRM effort is closely linked with customers' readiness to use existing mobile service (Liljander, Polsa and Forsberg, 2007) and the option of consumer opt-in (e.g. Barnes and Scornavacca, 2004; Bauer, et al., 2005; Leppäniemi and Karjaluoto, 2005).

Mobile advertising and promotional activities are directed towards potential patients with the objective to attract potential patients to a physician's practice, distinguishing themselves from competitors. The Mobile Marketing Association (2012a) defines mobile advertising as a form of advertising that is communicated to the consumer by a mobile device. Mobile advertising activities for physicians may include listings in mobile search pages, physicians' directories, and mobile practice apps or websites. However, as noted above, these activities are usually heavily regulated or restricted by legislation and thus should be examined on a per-country basis.

Another set of practice-centered objectives relate to a number of issues relevant for a physician's practice. On one side, there is the potential in the increase in operational efficiency that has been linked to the inclusion of mobile technologies into the workflow of medical practices (Harkke, 2005). The use of mobile technologies has been suggested to enhance operational efficiency through changing data access patterns (Liang et al., 2007). This higher operational efficiency could materialize by having fewer patients missing their appointments, making their appointments electronically instead of on the phone, or by making the patient encounter more efficient. Possible mobile marketing objectives for physicians in private practice are elaborated in table 3.3. The desire to increase patient satisfaction, increase operational efficiency and the resulting ability to see more patients per week were found as key future drivers for physicians to include email as a communication channel by physicians with their patients (Bard, 2002).

SMS messages do not require an adaptation to a specific operating system, whereas a mobile practice app does. Hence, the level of complexity of

mobile marketing communication varies significantly depending on the scope, objectives and tools to be used.

Objective	Description
Improve Image	The expected increase in a marketer’s corporate or brand image is a common driver for the inclusion of the mobile channel into the marketing communication process with customers. Physicians in private practice could equally expect image benefits stemming from offering websites optimized for mobile devices, offering mobile practice apps or permitting patients to communicate via SMS to make appointment for example.
Obtain new patients	New patients could potentially be obtained through a number of mobile marketing activities such as listings in mobile physician search sites, mobile-optimized physician practice websites, mobile practice apps. At the same time, better communication and enhanced relationships with existing patients, resulting from the increased use of mobile technologies in the communication process, are likely to increase positive word-of-mouth recommendations and earn higher evaluations on physician rating portals, among other benefits. This objective could be considered a clear marketing objective for any medical practice.
Increase patient satisfaction	Through the mobile-enhanced communication between the physician (or physician’s practice) and patient, patient satisfaction should increase. This increase in satisfaction may result from a better (perceived) accessibility to the physician or practice staff, an enhanced information exchange during or after the patient encounter, increased (perceived) convenience of communication by patients in general. Better communication with physicians has been linked to improved patient satisfaction.
Enhance communication with patients in general	As the most basic premise, the inclusion of the mobile channel could improve the communication with the patients from the perspective of the physician.
Internal Administrative Support	Mobile system could increase organizational efficiency, for instance by reducing the number of missed appointments or phone calls from patients. As pointed out by Harkke (2005), “mobile systems are intended to increase efficiency of human work and identifying the points in medical practice where mobile systems will have a positive impact is a goal worth pursuing.”

Table 3.3: Basic mobile objectives for physicians in private practice. Elaborated by author.

These capabilities will be distributed differently among private practice physicians, and will help decide if the mobile channel represents a viable option to communicate with existing and potential patients.

Considering the apparent need for marketing activities by a physician's practice, the macro-drivers that exert an increasing pressure on the adoption of the mobile channel into marketing communication mix, the abundant availability of mobile tools and the presence of feasible mobile marketing objectives for the physician in private practice, the inclusion of the mobile channel should be a common phenomenon in today's mobile age. As of now, it is not. The question is why not?

### **3.7 Barriers to Mobile Marketing by Physicians in Private Practice**

The fact that most physicians in Germany do not yet engage in mobile marketing activities as described above may be attributed to two major factors. The first factor is the general lack of marketing activities and the misinterpretation of marketing activities many members of this professional group have been found to share. The results of a recent survey conducted on behalf of the Public Health Foundation with physicians in Germany (Obermann and Müller, 2011) provide some interesting insights. First, the survey suggests that physicians as a professional group still do not see marketing measures as being important or very important to their medical practice. The top three objectives of marketing activities as indicated by respondents were the desire to inform patients about services (61.9%), to obtain new patients (43.2%), to inform patients in general (38.6%) and to differentiate their medical practice from competitors (30.6%). Second, the results suggest that physicians are only slowly making use of new technologies, as seen by the fact that very few physicians allow their patients to schedule appointments online.

The second factor is the low level of mobile technology use in communication with existing and potential patients. This is likely associated directly with the perception of mobile technology and its usefulness for said purpose by physicians. A number of academic endeavors have tried to

determine the factors that contribute to a physician's propensity to adopt or reject a new technology, including mobile devices or systems. The overall perception of the healthcare sector as a whole seems to be that actors in this industry tend to adopt new technologies slower than those of other industries (e.g., Dixon, 2010).

A study conducted by Bard (2002), investigating reasons why physicians were not using email with their patients, cited the preference for face-to-face interaction with patients, concern about too many patients sending email, concern about professional liability and the lack of reimbursement for online activities. Research by Chau and Hu (2002), focusing on the acceptance of telemedicine by physicians, found that the perceived usefulness of the new technology had a significant influence on the intention of physicians to use telemedicine, whereas the ease of use did not.

Chismar and Wiley-Patton (2003) examined physicians' intention to adopt internet-based health applications, focusing on practicing pediatricians in the state of Hawaii. Their study results suggest that pediatricians are willing to adopt and use those applications which are perceived as beneficial in helping the physicians perform their daily jobs, thus emphasizing the pragmatic perception that physicians have toward the adoption of information technology. The study also showed that subjective norms, such as peer pressure or how they will be perceived, did not influence pediatricians' decisions to adopt information health technology. Their survey results confirmed the importance of perceived usefulness on physician's usage intentions, whereas perceived ease of use was found not to have a significant impact. A possible explanation could be that on average physicians tend to have a higher level of competence, intellectual and cognitive capacity, adaptability to new technologies and reliable access to assistance in operating technology (Hu, Chau and Tam, 1999). The last point of this statement might be disputable in the case of physicians in private practice, who often do not employ employees specifically dedicated to information technology.

Han (2005) conducted academic research with physicians participating in a pilot trial of a specific mobile medical information system in Finland. The insights obtained seem to indicate that perceived usefulness of the mobile systems was the predominant factor influencing the physicians' acceptance of mobile technology. In line with previous research, perceived ease of use of new technology was found to be of limited importance in determining future use, due to an apparent learning curve of using the mobile system. Lu, et al. (2005) identified usability, security concerns, and lack of technical and organizational support as key barriers to PDA adoption by physicians.

In another study, Park and Chen (2007) investigated motivations affecting adoption of the smart phone among medical doctors and nurses. Perceived usefulness and perceived ease of use influenced the behavioral intention to use a smart phone. Acknowledging the consistency of their results with that of previous studies, the authors state that physicians' feelings about smart phone usefulness may play a more influential factor than their perception of ease of use in the determination towards usage. The study also found that the opportunity to observe others using a technological device would influence their attitudes towards actually using it, and that organization size and management support had a positive relation to adoption.

Gururajan and Gururajan (2008) identified clinical management and technological barriers as the dominant factors influencing adoption of wireless handheld technology in the Indian healthcare environment. One conclusion drawn from their data analysis is that in order for physicians to adopt and use wireless technology, they should realize direct benefits, such as saving money or consultation time, or indirect benefits, such as enhanced access to patient and medical data. As the authors state: "While some healthcare organizations are aware of the potential benefits they could gain by using mobile technologies, they encounter problems in adopting them and realizing the anticipated benefits. The success of innovative mobile applications in healthcare, however, depends not just on the soundness of the technology, but also on the organization's ability to embrace that technology to gain real benefits and enabling and encouraging the healthcare workers to use them."

Lack of time, a common characteristic of physicians as a professional group, might be a reason why they are rather slow adopters of new technologies. Physicians are perhaps some of the busiest professionals on the planet (Torrieri, 2012). They work in high-stress, data-intensive environments (SpyGlass Consulting, 2005), usually involving a very large number of patient contacts per week (e.g. Von Borstel, 2010). Hu, Chau and Tam (1999) suggested that many physicians have little interest in learning about a new technology, even if it is easy to use, due to time constraints. Contributing to this situation might be the fact that physicians have been found to keep many non-physician clinical tasks to themselves, in order to manage their risk as small business owners (Ludwick and Doucette, 2009), thereby reducing time to learn about and subsequently use new technologies.

A possible factor in the perception of risk associated with using the mobile medium for marketing activities in particular are the plethora of rules and regulations that govern physicians. As a professional group, physicians are severely limited in terms of permissible marketing activities towards their existing or potential patients, facing a plethora of laws and professional limitations regarding marketing and marketing communication activities. In the U.S., state medical boards establish permissible medical marketing statements by physicians, with restrictions varying from state to state. For example, some states entirely forbid the use of patient testimonials (Etna Interactive, n.d.). In Germany, physicians' marketing activities as a professional group are governed by a number of laws and regulations including the Act Against Unfair Competition (UWG), the German Medical Products Advertising Act (HWG), and the German Telemedia ACT (TMG). All of these are summarized in the Professional Code for Physicians (Musterberufsordnung fuer Aerzte - MBO) by the German Medical association, which regulates the ethical and professional obligations of physicians amongst themselves and with their patients. For information provided via the Internet alone, the remote services statutes (Teledienstgesetz (TDG) and the Teleservices Data Protection Act (Teledienstschutzgesetz) apply (Brandt, 2005; Kassenärztliche Bundesvereinigung, 2010 ). Not surprisingly, uncertainty about what marketing



activities are permissible has been shown to be high among physicians in Germany (Obermann and Müller, 2011). In a different context, the perceived risk resulting from the use of a new technology can also relate to potential misuse, loss or exposure of confidential data and insecurity about potential liability issues, as stated by Bard (2002) and Lu, et al. (2005).

As physicians in private practice can be perceived as entrepreneurs managing their own business, economic considerations will play a role in the decision to include mobile marketing communication. Cost factors associated with running a private practice include employees, insurance, taxes, rent and medical equipment, among others. In general, a user's perceived return on investment of acquiring new technology and the compatibility of the technology or medium influences the adoption thereof (Rogers, 2003). Specifically, the use of the mobile channel as a marketing communication tool is hindered by the uncertainty of return on investment (Valsecchi, Renga and Rangone, 2007). The cost, real or perceived, would include the cost of purchasing the necessary mobile devices or technology, maintenance, and personnel or administrative cost. In terms of adoption of electronic health records (EHR), for example, DesRoches, et al. (2008) found that financial barriers were viewed as having the greatest effect on decisions about the adoption thereof. However, Friedrich, et al. (2009) claim that mobile marketing is becoming economically feasible as costs are diminishing. In fact, using mobile technology and devices in their patient-directed communication might be as low as the cost of acquiring an iPad.

Research by Bramble, et al. (2010) and Menachemi, Powers and Brooks (2011) seems to support the notion that younger physicians would be more likely to adopt the new mobile technologies and devices available than older physicians would. Both studies focused on exploring the factors associated with the adoption of electronic health records (EHR) systems among the physicians in the United States. Interestingly, the research results of Bramble, et al. (2010) also indicate that working in independent practice decreases the propensity to use and adopt EHRs. Reporting results from a national survey of physicians in the United States, Wynia, Torres and Lemieux (2011) found

female physicians to be significantly less willing to use electronic personal health records, citing as primary barriers the privacy and liability concerns resulting from the use of this technology.

### **3.8 Conclusion**

Physicians in private practice are not expert marketers, and are not expected to be so. As they do not count on a marketing department that would be responsible for conducting mobile marketing activities on an ongoing basis, physicians in private practice face the same dilemma as small family-owned companies or start-up companies with limited marketing competences and resources. Given the prevalence of mobile technologies and devices, the changing patient-physician relationship and the technological feasibility provided by the mobile medium, the large-scale inclusion of the mobile medium into a physician's marketing communication seems plausible. However, it is important to point out that this observation is not meant to suggest that physicians using mobile technologies are automatically "better" physicians than those who do not. Rather, one could argue that the mobile channel constitutes an enabling technology that helps physicians to be more effective in their practice, both in regards to administrative efficiency and in the communication process towards their existing or potential patients. Considering the opportunities the mobile channel presents, it can contribute to overall patient satisfaction, which has been linked to better health outcomes, patient loyalty, and positive word-of-mouth, as discussed in the preceding chapters of this thesis. The mobile medium also provides the opportunity for physicians to become more successful economically, a consequence of the potential benefits mentioned above. The use of mobile technologies in a physician's practice stands to create a win-win situation, benefiting both the patient and the physician in private practice.

## CHAPTER 4

### RESEARCH DESIGN AND METHODOLOGY

#### 4.1 Research Objectives and Questions

As stated in section 1.3 of this dissertation, the research objectives were defined as follows:

1. To explore the reasons why gynecologists in private practice in Germany do not use the mobile medium to communicate with existing and potential patients.
2. To understand for which activities and for which objectives these physicians perceive the mobile medium as being best suited for communication with existing and potential patients.
3. To determine how important theoretical reduction-in-adoption barriers are in incorporating the mobile medium into the physician-patient communication process.
4. To explore whether gender, age, and status of private mobile use influence the research objectives above.
5. To examine for what purposes the pioneers, or early adopters in this field, already have or are planning to incorporate the mobile medium in their communication with their existing and potential patients.
6. To understand whether a physician's gender, age and status of private mobile use influences mobile activities.
7. To examine the benefits gained resulting from the actual incorporation of the mobile medium as perceived by these physicians.

Specifically, this research attempts to answer the following questions through two distinct questionnaires completed by gynecologists in private practice in Germany.

**Questionnaire A: Gynecologists currently not employing mobile technologies as a marketing or CRM medium (“Non-Users”)**

RQ1: What are the reasons why gynecologists in Germany are not using the mobile channel to communicate with existing and potential patients?

RQ2: Does gender have an influence on gynecologists’ reasons for not employing mobile technologies?

RQ3: Does age have an influence on gynecologists’ reasons for not employing mobile technologies?

RQ4: Does the status of private mobile use have an influence on gynecologists’ reasons for not employing mobile technologies?

RQ5: For which purposes do physicians perceive the greatest future potential of mobile technologies for marketing communication activities?

RQ6: Does gender have an influence on gynecologists’ perceptions of the usefulness of the mobile medium?

RQ7: Does a physician’s age have an influence on gynecologists’ perceptions of the usefulness of the mobile medium?

RQ8: Does the status of private mobile use have an influence on gynecologists’ perceptions of the usefulness of the mobile medium?

RQ9: What are important perceived facilitators to contribute to increased use of the mobile medium as a marketing communication and CRM tool for this group?

RQ10: Does gender have an influence on a physician’s evaluation of these factors?

RQ11: Does age have an influence on a physician's evaluation of these factors?

RQ12: Does the status of private mobile use have an influence on a physician's evaluation of these factors?

**Questionnaire B – Physicians already using mobile technology in the communication process with their patients (“Users”)**

RQ13: For what purposes do these physicians already use, plan to use or not plan to use the mobile medium in their communication with existing and potential patients?

RQ14: What impact do gender, age group and status of private mobile use have on the state of current, planned or unplanned use of mobile technologies of participating gynecologists?

RQ15: What are the experiences that physicians perceive as a result of using mobile technologies in their medical practice?

RQ16: What associations, if any, exist between currently used mobile activities and a perceived increase in patient satisfaction.

**4.2 Research sample and data collection**

The following research was conducted in Germany with gynecologists in private practice. The study was made feasible through the cooperation of a leading direct-patient company working with gynecologists in Germany. The company agreed to support this academic research by agreeing to establish contact between the researcher and a significant number of gynecologists in private practice in Germany. The company agreed that the researcher was permitted to contact a total of 2300 physicians in the company's master database, selected at random. The database information available to the researcher included the physicians' names, practice addresses, emails, phone and fax numbers. The explicit understanding between the company and the

researcher was that strict confidence of the participating physicians' names and information would be maintained. The company agreed to support this research without any compensation.

The research was carried out in two phases. In the first phase, a pilot study was conducted in order to test the original research instrument developed for the study. The questions were developed based on the objective of the researcher, insights on related topics from academic research and the insights obtained through four informal and semi-structured interviews. One interview was conducted with the Managing Director of the collaborating firm and three with gynecologists in private practice in Germany. Of these gynecologists, two did not use mobile technologies for marketing communication and CRM purposes, one had started to do so. These informal interviews aimed to better understand the topic of mobile technology as a potential marketing communication and CRM medium from the perspective of the physicians. The insights from these interviews helped to identify relevant issues in three primary areas: barriers to adoption, perceived usefulness, and facilitators to possible adoption for the group of "Non-Users". For the group of "Users", the objective was to determine how these physicians were already using mobile technologies, which activities they planned to use in the future and which they did not, and to understand their experiences.

The pilot study was conducted between April and May 2011. A total of 200 gynecologists were contacted, resulting in 63 replies, 46 from Non-Users (physicians not employing the mobile channel in communication with their existing or potential patients) and 17 from Users (physicians stating they already did so to some degree). The pilot study revealed that the majority of gynecologists did not presently use the mobile medium as a marketing communication or CRM tool in their medical practice. Due to these insights two principal decisions were made. The first was to focus the ensuing research on the Non-User group, being the largest group. The second was to use the information gathered from the second group for purely exploratory purposes. In addition, some answer choices as well as the layout of the instrument was slightly modified to facilitate completion. The telefax was selected as delivery

and response medium of the survey instrument. This decision was based on the recommendation of the cooperating direct-patient firm and their extensive experience administering surveys to gynecologists in Germany. The rate of response seems to validate the claim that the fax still constitutes a suitable channel for physicians, a critical factor being the convenience and relatively low time. Physicians as a professional group are generally characterized by pronounced lack of time, thus making the identification of the most suitable research instrument an important consideration.

The main research was subsequently carried out between September 6 and November 2, 2011. A total of 2300 gynecologists, excluding those contacted in the pilot study, were selected at random from the company's database. The survey instrument consisted of a coversheet and two distinct questionnaires, one for the Non-User group, one for the User group. In the personalized coversheet, the purpose and academic nature of the study was explained and the author identified. The gynecologists were subsequently asked to complete and return the questionnaire (questionnaire A for Non-Users, questionnaire B for Users) that corresponded to their status of employing or not employing the mobile medium in their communication with existing and potential patients.

For the group of Non-Users, questionnaire A contained a set of 3 questions. Question #1 aimed to understand the reasons why this group of gynecologists was presently not using mobile technology or devices in communication with existing or potential patients. Question #2 aimed to determine how this group perceived the usefulness of mobile technologies for a variety of activities and objectives related to feasible marketing communication and CRM activities. Question #3 aimed to explore how gynecologists perceived the theoretical reduction in a number of plausible and theoretical adoption barriers as a prerequisite for using mobile technologies for stated purposes in the future. For the secondary group of Users, questionnaire B contained a set of 2 questions. Question #1 was aimed to understand how these gynecologists were employing mobile technologies in their medical practice in relation to

marketing communication activities. The purpose of question #2 was to gain insights into their experiences with the mobile medium.

Both questionnaires additionally asked the participating physicians to indicate gender, age group and whether or not they were using mobile devices privately for professional purposes, such as accessing medical information via a mobile application. For the return of the completed questionnaire, a fax number registered to the collaborating was provided on each of the two questionnaires. No financial incentive of any kind was offered for the completion of the questionnaire. Teamnet GmbH, a service company specialized in sending large volume of facsimiles for commercial and non-commercial purposes, distributed the questionnaires. In all, 119 transmissions of the questionnaire failed due to wrong contact numbers. 2181 gynecologists were contacted successfully, resulting in a total of 427 useable returned questionnaires. The completed questionnaires were received within 5 working days on average. Given the sensitive nature of the research subjects, no follow-up calls or other efforts were made to urge completion of the questionnaires. In this phase in particular the researcher was supported by an employee of the firm who assisted in filing and ordering the received faxes. The questionnaire data was subsequently recoded in a Microsoft Excel file, transferred to SPSS (20.0) and coded for data analysis.

### **4.3 Questionnaire Development**

In questionnaire A (Non-Users) the purpose of question #1 was to understand why these physicians were not currently employing mobile technology in communication with their patients. The question explores barriers to the adoption of mobile technologies for marketing communication purposes by gynecologists in private practice. Of the eight individual Likert-type response items, seven were adapted from previously conducted studies on technology adoption or rejection, focusing on both physicians and other research populations. Both inhibitors and negatively-oriented antecedents to acceptance and adoption were employed in order to provide for a feasible selection pertinent to the specific situation. The items included were “lack of time” (e.g. Hu, et al, 1999), “perceived risk” (e.g. Bard, 2002; Lu, et al., 2005), “lack of



information” (Cruz, et al., 2010a; Cruz, et al., 2010b), “lack of usefulness” (Park and Chen, 2007; Shankar, et al. 2010; Cruz, et al. 2010b), “cost” (e.g. DesRoches, et al. 2008; Cruz, et al., 2010b; Wan, Luk and Chow, 2005, Valsecchi, Renga and Rangone, 2008), “complexity” (e.g. Davis, et al, 1989, Cruz, et al., 2010; Shankar, et al., 2010). The items “demand from patients” and “lack of patients” were added in order to account for the specific context of physicians working out of their own medical practice. Changes in wording were made to make them applicable for the topic under investigation.

The purpose of question #2 was to understand how gynecologists perceive the usefulness of a range of feasible mobile activities and objectives, as described in tables 3.1 and 3.2. The Likert-type response items were developed to reflect the range of feasible applications and objectives for the use of mobile technologies and devices pertaining to gynecologists in Germany. The response items were developed based on in-depth interviews with three gynecologists, as well as with the managing partner of the collaborating firm, A conscious effort was made to include both applications pertaining to activities within the medical practice as well as from outside. In total, 9 items relating to activities and 4 items relating to objectives or benefits were included. As previously discussed, a particularly a range of CRM activities performed within a medical practice, focus on the physician-patient encounter. For this reason, the inclusion of the pre- and post-encounter situation was deemed relevant. The notion that mobile technology and devices are suitable for supporting the physician at the point of care or, in other words, in the encounter with the patient, is supported by Banderker and Van Belle (2009) among others. The item “offering additional services” refers specifically to the so-called “individual health services”, or “IGEL” (Individuelle Gesundheitsleistungen), available in the German healthcare system. These are services physicians can offer to their patients which are not covered by health insurance, thus necessitating a direct payment from the patients themselves. Due to the lack of prior research on this particular topic, the findings are purely of exploratory nature.

The purpose of question #3 was to understand how respondents felt the reduction of barriers would contribute to their decision to adopt mobile

technologies for marketing communication activities. The Likert-type items reflect most of the barriers included in question #1, while extending the range to include hypothetical options. The item “economic incentives” refers to hypothetical assistance from the government, health insurers or the private sector for covering the cost of providing services to existing or potential patients. The view that government, healthcare management and the ICT industry can help to push adoption of mobile devices corresponds to that of Banderker and Van Belle (2009). The item “increased compatibility” is derived from Rogers’ (2003) notion that new technology adoption tends to accelerate with the increased compatibility to existing technology or media. The following items were also included: “training”, “evidence”, and “increased availability”. These are based on insights obtained through interviews and are purely exploratory in nature.

The questionnaire for the group of Users contained a set of two questions. Question #1 aimed to understand for which activities or purposes this group of gynecologists was already employing or planned to employ the mobile medium as a marketing communication tool. The range of items corresponds to that of question #2 of the Non-User group. Question #2 aimed to understand the experiences of those physicians already using the mobile technologies. The range of items was elaborated to include experiences relating to the physician and medical practice, as well as to the patients. The items are exploratory and therefore no research propositions were drawn.

#### **4.4 Methodology**

A number of issues need to be discussed relating to question format, measurement and variable treatment, as all of these issues have direct implications on subsequent statistical analysis. First, this research employs individual Likert-type items. As discussed by Clason and Dormody (1994), the discrete nature of the response to a Likert-type question has to be acknowledged by the researcher. According to the authors, Likert-type items are single questions that employ some aspect of the original Likert response alternatives. The authors also state, “While multiple questions may be used in a

research instrument, there is no attempt by the researcher to combine the responses from the items into a composite scale.”

A second issue that needs to be addressed by the researcher is that of question format or response format. In questionnaire A, elaborated for the group of Non-Users, a four-point Likert-type response format ranging from “strongly agree” to “strongly disagree” was used in questions #1 and #3, and from “not useful at all” to “very useful” in question #2. The decision to use four-point Likert-type questions was based on the desire to eliminate the midpoint. An even number of levels is characterized by the absence of a central point of equilibrium and is generally adopted when it is convenient to stimulate the interviewee towards a non-neutral position (Eboli and Mazzulla, 2009). The option to delete the neutral response is not uncommon in academic research (e.g., Clason and Dormody, 1994) and has been argued to minimize social desirability bias. Omitting “Don’t Know” response options from survey questions has also been reported to not substantially reduce data quality (e.g., Krosnick, et al., 2002).

Respondents to the exploratory questionnaire B (Users) were provided with a slightly different response format in order to accommodate the specific nature of the questions. In question #1 the respondents indicated their readiness to use mobile technologies with the response items “Already Use”, “Plan to Use in the Future” and “Not Planned”. Question #2 offered 5 response choices, the four-point Likert type response identical to that of questions #1 and #3 in questionnaire A, plus the response category “no experience”, as applicable for this specific situation.

A third issue which needs to be addressed is the nature of the response variables generated. The choice of the applicable statistical techniques are largely determined by the scale of measurement of the response variables (e.g., Greenland, 1985; Anath and Kleinbaum, 1997). In our research, the numbers assigned to Likert-type items in questionnaire A express a "greater than" relationship. Therefore, Likert-type items generally fall into the ordinal measurement scale (Boone and Boone, 2012). While the response categories

have a rank order, the intervals between values cannot be presumed equal by the researcher (e.g., Jamieson, 2004). Even though ordinal variables are often treated as continuous variables in academic research, the practice is highly controversial. Hawkes (1971) and Reynolds (1973), among other authors, suggest that the biases in using continuous-variable methods for ordinal variables are large and that special techniques for ordinal variables are required.

If the categories of the response variable have a natural order, they can be considered ordinal-scaled outcome variables. In questionnaire A (Non-Users), this characterization holds for the response variables of questions #1 (“strongly disagree” to “strongly agree”), question #2 (“not useful at all” to “very useful”), and question #3 (“strongly disagree” to “strongly agree”). In questionnaire B, the response categories in question #2 also reflect a natural ordering ranging from and “strongly disagree” to “strongly agree”. In this particular case, the answer choice “does not apply” does not represent an interruption to a natural ordering but rather disqualifies the respondents from providing a meaningful answer given the specific context of the question.

Consequently, ordinal logistics regression was used to explore and describe the associations between a number of predictor (independent) variables and a number of ordinal outcome (dependent) variables, as suggested by Agresti (1996) and Hosmer and Lemeshow (2000). The application of the traditional ordinal least squares (OLS) regression model for ordinal dependent variables is not appropriate (e.g., Long, 1997; McCullagh, 1980). Specifically, the proportional odds model (POM) model, proposed by McCullagh (1980), is also the most widely used logit model for ordinal dependent variables (e.g., Fullerton, 2009). While facilitated by the increasing calculation capacity of statistical software packages such as SPSS, the appeal of this particular model is partly due to the fact that the calculation of one common odds ratio is possible, facilitating result presentation (Bender and Grouven, 1987). The goal of this proportional odds model is to simultaneously consider the effect of a set of explanatory variables on a number of categorical outcome variables. Ordinal regression considers the probability of an event and all others above it in the

ordinal ranking. The underlying assumption of the proportional odds model is that the effects of the explanatory (independent) variables are the same across the different thresholds; this is called the assumption of proportional odds or parallel lines. In order to facilitate intuitive interpretation of the results, the Odds Ratio (OR) will be calculated by exponentiating the regression estimate for each level. As Agresti (1996, p. 23) explains, the odds ratio can equal any nonnegative number. The odds ratio shows the increase ( $OR > 1$ ) or decrease ( $OR < 1$ ) in the likelihood of a respondent of a category (e.g., gender, age group) to indicate a higher level on the dependent variable measurement (e.g., degree of usefulness) compared to the reference group. For ordinal logistics regression, the reference category is set by SPSS to the last category of the predictor variable and may not be manually selected. Hence, the predictor categories for the analyses to be performed are “female” in gender, “over 60” in age group and “User” in the private mobile use categories. The output results for the regression analyses are therefore to be interpreted in comparison with the reference group. As the appropriate link function, the logit function was selected as the assumption of proportional odds (or parallel lines), stating that the effects for the explanatory variables are consistent or proportional across the different thresholds for the majority of cases. The coding information of the variables in SPSS is exhibited in tables 1-3 in the appendix.

The response categories in question #1 - “currently use”, “plan to use” and “don’t plan to use” — will be treated as nominal variables. A natural ordering could be suggested to exist between “currently use” and “plan to use”, but not with “don’t plan to use”. Consequently, multinomial regression will be utilized.

Taking all of the above statements in consideration, the following statistical analysis will be utilized for the analysis of study 1 (Non-Users)

1. Cross-tabulation and chi-square analysis will be used to determine the correlation between gender, age group and status of mobile private use

2. Cross-tabulation analysis and frequency calculations will be used to provide a general review of survey respondents' characteristics and the descriptive survey results for each question.

3. Ordinal logistics regression will be employed to:

- a) Examine the associations between the explanatory variables of gender, age group and status of private mobile use and the responses on the perceived barriers of adoption.
- b) Examine the associations between the explanatory variables and the perceived usefulness of the mobile medium for a range of activities and objectives.
- c) Examine the associations between the explanatory variables and the perceived importance of facilitators for adopting the mobile medium as a marketing communication tool.

For responses of study 2 (Users) the following statistical analysis will be employed.

1. Cross-tabulation and chi-square analysis will be used to determine the correlation between gender, age group and status of mobile private use.

2. Descriptive statistics, cross-tabulation analysis, frequency calculations, and graphics will be used to provide a general review of survey respondents' characteristics and the descriptive survey results for each question.

3. Direct logistics regression will be employed to:

- a) Examine the associations between the explanatory variables of gender, age group and status of private mobile use and the current, planned and not planned use of mobile technologies.
- b) Examine the associations between current mobile activities and reported changes in patient satisfaction.

The SPSS variable legends and coding information as well as the parameter estimate calculations of the logistic regression analyses will be exhibited in the appendix.

## CHAPTER 5

### RESEARCH RESULTS

#### 5.1 Introduction

This chapter reports the research results obtained for the dissertation. The results of questionnaire A, focusing on the Non-User group, those gynecologists not currently employing mobile technologies as a marketing communication and CRM tool in their practice, are presented first, followed by the results of the User group.

#### 5.2 Survey Response

Of the 2181 gynecologists successfully contacted, a total of 427 usable questionnaires were returned, resulting in an overall response rate of 19.6%. The breakdown of the respondents' demographic characteristics is presented in table 5.1. The response rate was deemed acceptable due to comparison with other studies in Germany (e.g., Stiftung Gesundheit, 2011). The potential biases in this study were evaluated by comparing the gender to understand if there is a significant difference in the sample population and the non-respondents. As shown in table 5.1, 36% of the non-respondents were male and 64% female, compared to 33% and 67% of the respondents.

	Non-Respondents		Respondents	
	N	%	N	%
Male	653	36%	141	33%
Female	1001	64%	286	68%
Total	1754	100%	427	100%

Table 5.1: Gender comparison of non-respondents and respondents

According to the German Medical Association (Bundesaerztekammer, 2012), there were 9870 gynecologists in private practice on December 31, 2011, of which 5664 were female (57.3%). According to the same statistic, 3.7%

of all gynecologists in private practice were under the age of 39, 32.2% between the age of 40 and 49, 41.1% between 50 and 59, and 23% over 60 years old.

Of these returned questionnaires, 327 were from the “Non-User” group and 100 from the “User” group. A combined 67% of the respondents were female physicians (n=286) and 33% (n=141) were male. Overall, the returned questionnaires contained less than 2% of missing values. The decision was thus made by the researcher to use the “exclude cases pairwise” procedure, in which cases (respondents) are excluded only if they are missing data required for the specific analysis in SPSS. The cases will be included for the analysis for which they have the necessary information.

### 5.3 Respondent Demographics, Questionnaire A (Non-Users)

The participants’ general characteristics are presented in table 5.2.

<b>Variables</b>	<b>Category</b>	<b>n</b>	<b>%</b>
<b>Gender</b>	Male	105	32.1
	Female	222	67.9
<b>Age Group</b>	< 41	26	8.0
	41- 50	142	43.4
	51 -60	123	37.6
	> 60	36	11.0
<b>Private Mobile Use</b>	User	141	43.1
	Non-User	186	56.9

Table 5.2: General characteristics of respondents (questionnaire A)  
*Note: n refers to the number of participants*

Female gynecologists comprised 68% of the sample. Compared to male participants in the study, females tended to be younger while exhibiting a slightly higher degree of non-use of mobile technologies. Interestingly, over half



of the gynecologists of the Non-User group stated that they do not use mobile technology and devices for professional purposes, such as using mobile applications for drug referencing, with female gynecologists exhibiting a slightly higher rate of non-use than their male counterparts. This high percentage suggests that a majority of respondents have not yet entered the mobile age.

	Male		Female		Total	
	n	%	n	%	n	%
<b>Age group</b>						
< 40	3	2.9	23	10.4	26	8.0
41 - 50	32	30.5	110	49.5	142	43.4
51 - 60	44	41.9	79	35.6	123	37.6
> 60	26	24.8	10	4.5	36	11

**Private Mobile Use**

User	47	44.8	94	42.3	141	43.1
Non-user	58	55.2	128	57.7	186	56.9

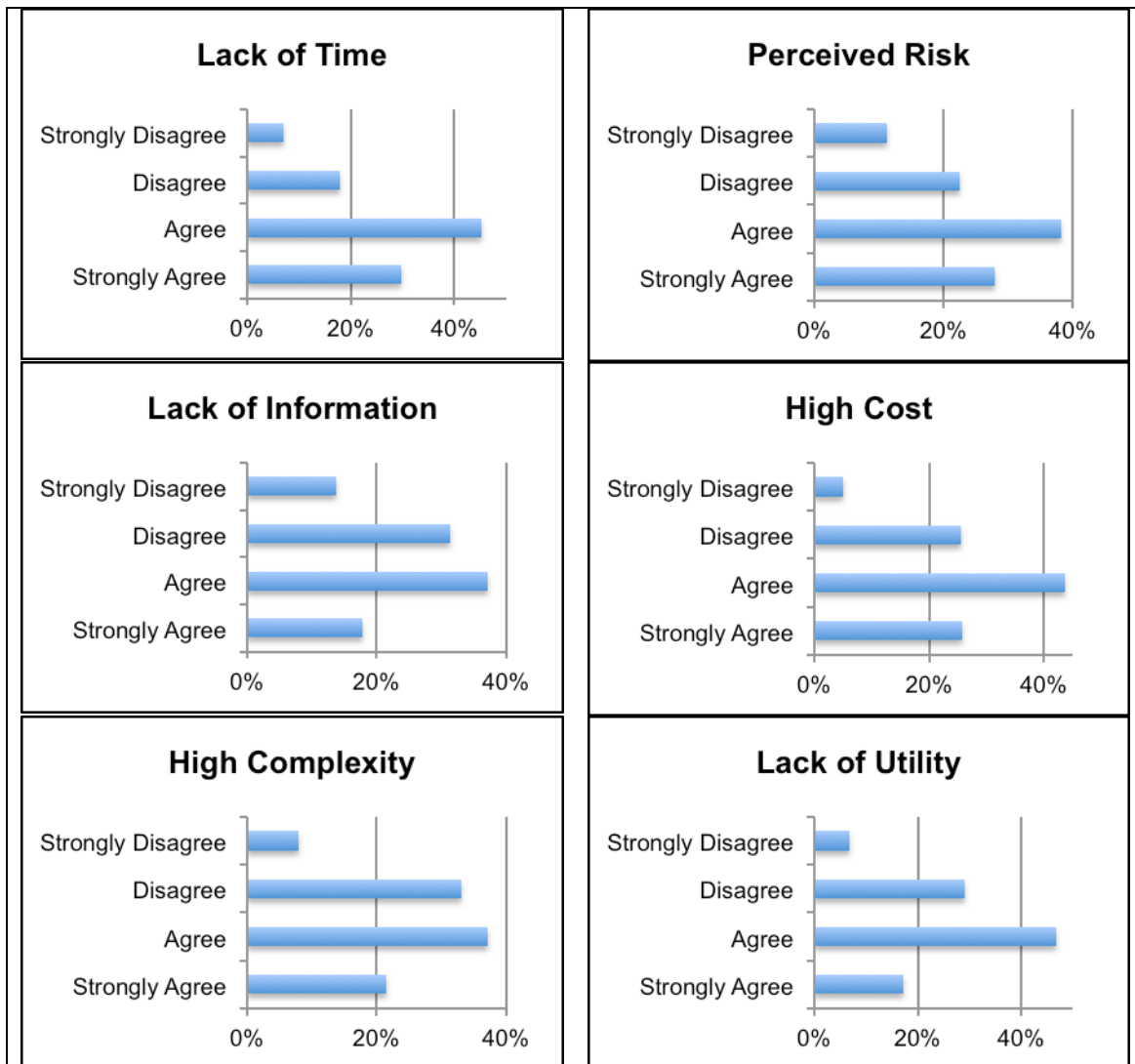
Table 5.3: Crosstab of male and female respondents (questionnaire A)  
*Note: n refers to the number of participants*

A chi-square test of independence (with Yates Continuity Correction) indicated no significant association between gender and status of private mobile use  $\chi^2 (1, n = 327) = .086, p = .770, phi = .023$ . As suggested by Pallant (2007, p. 216) the Yates's Correction for Continuity compensates for the overestimate of the chi-square value when used with a 2 by 2 table. The results of the chi-square test between age group and status of private mobile use also indicated no statistically significant association,  $\chi^2 (3, n=327) = 5.94, p = .115, phi = .135$ . The results of the chi-square test for independence however did indicate a significant association between gender and age group,  $\chi^2 (3, n=327) = 38.48, p = .000, phi = .342$ , suggesting that female respondents tended to be younger than their male colleagues.

### 5.4 Analysis for Research Question #1

Research question #1: What are the reasons why gynecologists in Germany are not using the mobile channel to communicate with existing and potential patients?

To address research question #1, we used descriptive statistics in order to obtain the response frequencies and percentages. A graphical representation of the response frequencies is presented in figure 5.1 below. The corresponding frequency table is exhibited in the appendix.



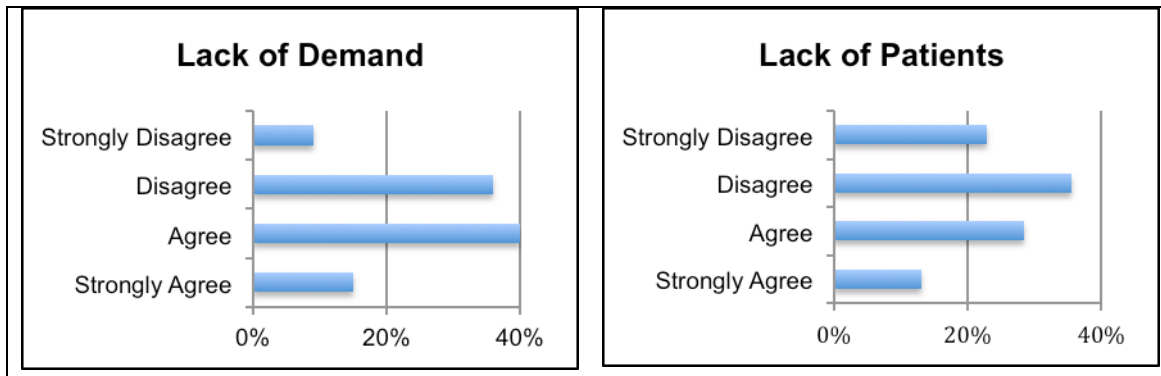


Figure 5.1: Frequency distribution: reasons for not employing mobile medium

"Lack of time" accounted for the highest accumulated percentage. Around 74% of rejection motives were related to this item. It also registered the highest relative percentage of "strongly agree" of any item on the list. The "high cost" factor accounted for a total of 70.1%, while registering the second highest relative percentage of "strongly agree" (25.7%) of all items. "High risk" and "lack of usefulness" followed with 65.7% and 63.6%, respectively, when combining the "agree" and "strongly agree" responses. "Complexity", a common barrier in technology adoption, appears to be less of an obstacle than "usefulness". The latter implies that many gynecologists do not perceive enough potential advantages of the mobile medium to warrant its inclusion in the marketing communication process. "Lack of information" registered "agree" and "strongly agree" responses from 54.7% of survey participants, which might hint at an existing information deficit on the subject. The item "lack of patients" as rejection motive was refuted by the majority (57.2%) of participating gynecologists. Interestingly, a total of 45% of responding gynecologists either disagreed or strongly disagreed with the notion that "lack of demand" by patients for the inclusion of the mobile medium in the communication process was a barrier to adoption. This may imply that whereas physicians perceive such a demand, a significant number of them continue to neglect it.

## 5.5 Analysis for Research Question #2

Research question #2 was aimed at understanding the influence of gender on the gynecologists' perception of different barriers to using the mobile

medium in their marketing communication towards existing and potential patients. The research question asked: “Does gender have an influence on gynecologists’ reasons for not employing mobile technologies?”

As illustrated in Table 5.4, the results from ordinal regression analysis, controlling for age group and status of private mobile use, show differences between male and female gynecologists’ perception of different adoption barriers, as indicated by the odds ratio. However, only two differences were statistically significant, as indicated by the corresponding p values. Specifically, male gynecologists were marginally ( $p < .1$ ) less likely to rate the adoption barrier “perceived risk” in a higher response category than their female colleagues (OR 0.69, CI 0.41-1.00,  $p = .052$ ). Put differently, male gynecologists were 31%  $[(.69 - 1) * 100]$  less likely to rate “perceived risk” in a higher response category than their female counterparts. In contrast, male gynecologists were marginally more likely (OR= 1.53, CI =0.97-2.63,  $p = .068$ ) to choose a higher response category for “Lack of Information” than their female colleagues.

Variable	OR	95% CI	<i>p-value</i>
Lack of Time	0.81	0.51-1.29	.383
Perceived Risk	0.69	0.41-1.00	.052
Lack of Information	1.53	0.97-2.63	.068
Lack of Utility	1.23	0.77-1.95	.384
High Cost	0.92	0.58-1.45	.703
High Complexity	0.90	0.57-1.41	.633
Lack of Demand	1.21	0.76-1.91	.423
Lack of Patients	0.84	0.53-1.33	.456

Table 5.4 Effect of gender on perceived adoption barriers

Notes: OR: Odds Ratio; 95% CI: 95% Confidence Interval; Reference category: females; Adjusted for age group and status or private mobile use; Link function: logit

### 5.6 Analysis of Research Question #3

The purpose of research question #3 was to determine the influence of age group on a number of barriers as evaluated by the participating

gynecologists. The research question asked: “Does age have an influence on gynecologists’ reasons for not employing mobile technologies?” The results of the ordinal logistics regression are exhibited in table 5.5 below.

Gynecologists in the “under 41” age group were significantly less likely to assign a higher level of importance to the adoption barrier of “high complexity” than their colleagues in the “over 60” age group, the reference category for this analysis (OR 0.18, CI 0.07-0.49,  $p=.001$ ). The odds ratio of .18 can be interpreted as physicians in the “under 41” age group being 82%  $[(.18 -1) * 100]$  less likely to indicate a higher level of agreement than their colleagues in the reference group, holding all other variables constant. The result seems to indicate that for younger physicians, the issue of complexity of mobile technology is less severe than for their older colleagues. For the same age group, the barrier “lack of time” was marginally significant compared to the reference group (OR 0.41, CI 0.15 – 1.11,  $p= .078$ ). Gynecologists in the “under 41” age group were 59% less likely to cite “lack of time” as an adoption barrier than their “over 60” counterparts.

Gynecologists in the “51-60” age group also differed in their levels of agreement to possible adoption barriers compared to the reference group of this analysis. However, only the item “lack of patients” proved to be marginally significant with a calculated odds ratio of .51 [CI 0.25-1.05]. The result indicates that gynecologists in this age group were less likely to rate “lack of patients” as an important adoption barrier. The differences in the calculated odds ratios for the entire analysis seems to suggest that age group does have an influence on their reasons for not employing the mobile medium in their communication with existing and potential patients. Statistically significant at the  $p < .05$ , and marginally significant at the  $p < .01$  level, age group seemed to influence a number of items as discussed above.

Variable	Physician Age Group											
	<41 years				41-50 years				51-60 years			
	OR	95% CI	p-value	OR	95% CI	p-value	OR	95% CI	p-value	OR	95% CI	p-value
Lack of Time	0.41	0.15 - 1.11	.078	0.71	0.34 - 1.11	.337	0.91	0.45-1.86	.796			
Perceived Risk	0.98	0.37- 2.56	.962	1.27	0.63-2.57	.507	1.64	0.82-3.28	.167			
Lack of Information	0.71	0.27-1.31	.492	0.78	0.38-1.46	.489	0.51	0.25-1.29	.062			
Lack of Utility	0.84	0.31-2.26	.735	0.86	0.42-1.78	.691	1.74	0.85-3.57	.132			
High Cost	1.74	0.65-4.63	.271	1.79	0.87-3.67	.115	1.28	0.63-2.59	.499			
High Complexity	0.18	0.07-0.49	.001	0.55	0.27-1.13	.104	0.78	0.39-1.58	.493			
Lack of Demand	0.97	0.36-2.63	.959	1.32	0.63-2.76	.455	1.65	0.80-3.41	.176			
Lack of Patients	0.75	0.28-1.99	.557	0.51	0.25-1.05	.066	0.70	0.35-1.41	.325			

Table 5.5 Effect of age group on perceived adoption barriers

Notes: OR: Odds ratio; 95% CI: 95% Confidence interval; Reference category: > 60 years; Adjusted for gender and status of private mobile use; Link function: logit.

## 5.7 Analysis of Research Question #4

The purpose of research question #4 was to determine the influence of the status of private mobile use on a number of barriers as evaluated by the participating gynecologists. The research question asked: “Does the status of private mobile use have an influence on gynecologists’ reasons for not employing mobile technologies?” As mentioned before, the status of private mobile use refers to physicians using the mobile medium themselves for professional, non-marketing purposes, such as using mobile applications to access drug referencing guides or medication calculators. The two groups in this category are therefore “Non-Users” and “Users”, the latter serving as the reference group for this particular analysis. The results of the ordinal logistics regression are exhibited in table 5.6 below.

Variable	OR	95% CI	<i>p-value</i>
Lack of Time	0.85	0.56-1.29	.450
Perceived Risk	1.07	0.71-1.60	.748
Lack of Information	1.42	0.95-2.58	.088
Lack of Utility	1.07	0.71-1.62	.752
High Cost	1.18	0.78-1.78	.426
High Complexity	1.68	1.12-2.54	.013
Lack of Demand	1.45	0.96-2.2	.075
Lack of Patients	1.57	1.04-2.36	.031

Table 5.6. Effect of private mobile use on perceived adoption barriers

Notes: OR: Odds Ratio; 95% CI: 95% Confidence Interval; Reference category: users; Adjusted for gender and age group; Link function: logit.

Most notably, the results from ordinal regression logistics indicate that respondents not using mobile technologies for professional purposes were significantly more likely to perceive “high complexity” of mobile technologies as an important adoption barrier. Specifically, the odds of Non-Users citing “high complexity” are 1.68 times those of Users of mobile technology, holding all other variables constant (OR 1.68, CI 1.12 – 2.54,  $p = .013$ ). Therefore, gynecologists of the Non-User group were 68% more likely to assign to

“complexity” as an adoption barrier a higher level of agreement. Familiarity with the mobile medium thus seems to influence the perception of complexity of mobile marketing activities for the medical practice.

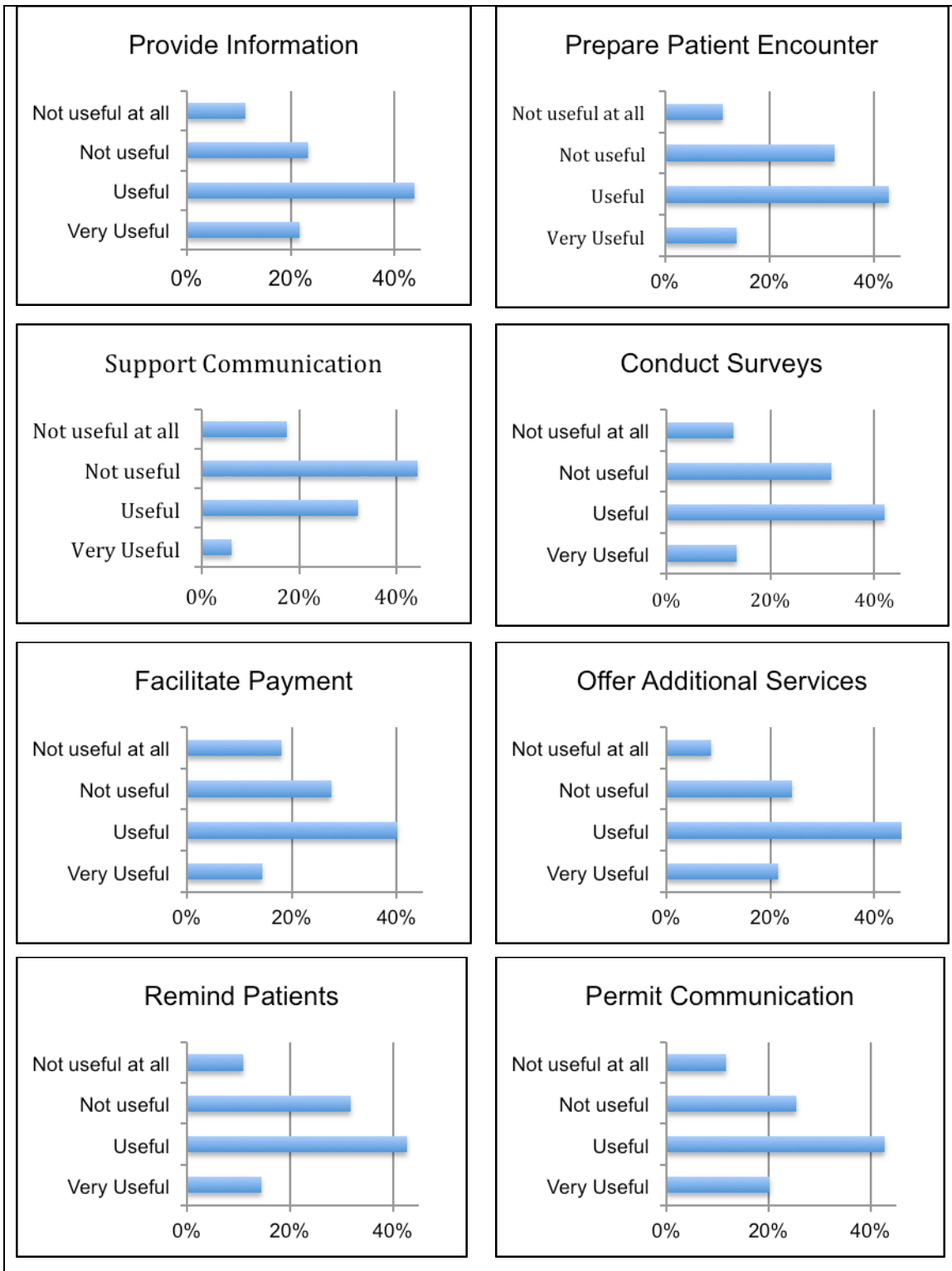
“Lack of patients” also differed significantly between the User and the Non-User groups, with an odds ratio of 1.57 (CI 1.04 – 2.36,  $p = .031$ ). The odds of a Non-User perceiving “lack of patients” as important were 1.57 compared to the reference group and holding all other variables constant. Furthermore, two odds ratios proved to be marginally significant at the  $p < .1$  level: “Lack of information” (OR 1.42, CI 0.95 - 2.58,  $p = .088$ ) and “lack of demand” from patients (OR 1.45, CI 0.96-2.2,  $p = .075$ ). As both odds ratios are above 1, the odds of indicating a higher level for this group were higher than for the reference group of Non-Users.

## **5.8 Analysis for Research Question #5**

One insight we wanted to obtain from those gynecologists who are not employing the mobile medium in their medical practice was to understand their perception of usefulness for a number of activities and objectives. The research question asked: “For which purposes do physicians perceive the greatest future potential of mobile technologies for marketing communication activities?”

An initial observation of the data illustrated in figure 5.2 reveals that the majority of gynecologists seem to have predominantly positive perceptions regarding the usefulness of the mobile medium for the given range of activities and objectives. However, observing the information more closely, we could conclude that while the overall perception of the mobile medium is positive, the level of enthusiasm is moderate, considering the level of responses in the “very useful” category. Nevertheless, this situation might be somewhat surprising, given the fact that even though such positive connotations exist, this group does not yet utilize the mobile medium.





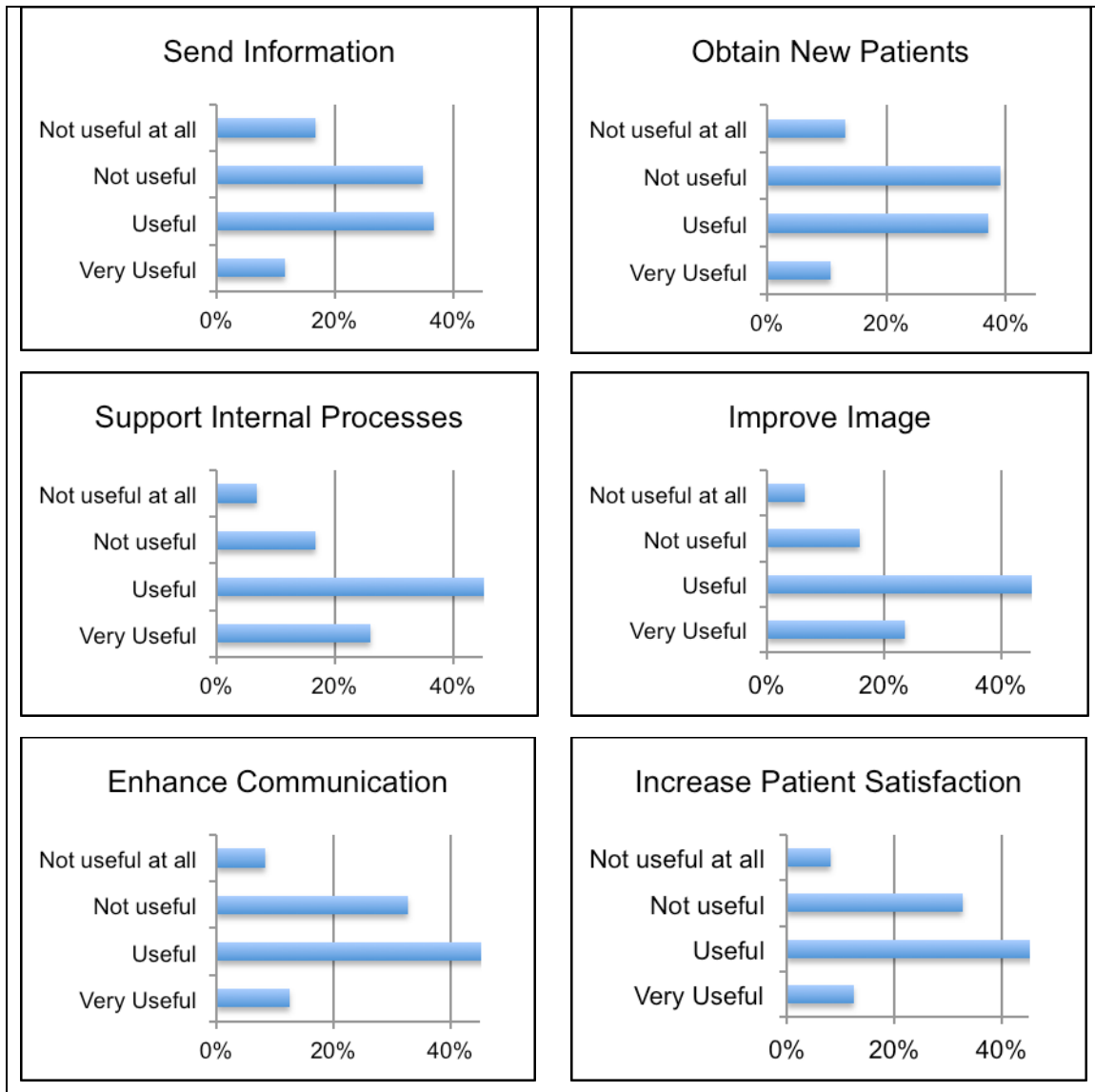


Figure 5.2 Frequency Distribution: perceived usefulness of the mobile medium for marketing communication activities and objectives

Analyzing the data in detail reveals a number of interesting insights. First, the highest accumulated percentage in the “useful” and “very useful” categories reveals that the participating physicians perceive the mobile medium as most useful as a means to offer additional services (66%), to provide information (63.9%) and to permit patients to communicate with the physician’s practice using a mobile device (63%).

The lowest perceived usefulness in both the “useful” and “very useful” categories was for “communication support”, referring to supporting the patient encounter, with a combined percentage of only 38.2%. This finding is surprising.

Using a mobile tablet device during the patient encounter to support the explanation of the diagnosis with the help of graphical information, obtained from a medical mobile application and displayed on the screen of the mobile device, ranks among the simplest ways to use a mobile device. The top two items, “improve image” and “internal administrative support”, obtained a combined percentage of “useful” and “very useful” responses of 77.6% and 76.5%, respectively. Surprisingly, only about 61% of respondents viewed the mobile medium as being “useful” or “very useful” to increase patient satisfaction.

### **5.9 Analysis for Research Question #6**

The purpose of research question #6 was to determine the influence of the physicians’ gender on the perceived usefulness of the mobile medium for a number of activities and objectives. The research question asked “Does gender have an influence on gynecologists’ perceptions of the usefulness of the mobile medium?”

An examination of the odds ratio in table 5.7 suggests that male gynecologists were more likely to assign a higher level of usefulness to the mobile medium than female gynecologists. For only two items on the list, “facilitate payments” and “administrative support”, the former group was less likely to do so. By focusing on the statistically significant results, we see that “prepare patient encounter” and “administration support” were statistically significant at the  $p < .05$  level. Male respondents were thus more likely to perceive mobile devices and technology as useful to prepare the encounter with the patients than their female counterparts.

Specifically, the odds of having a higher perceived usefulness for male gynecologists are 1.59 times those of women, holding all other variables constant (OR 1.59, CI 1.00 – 2.52,  $p = .049$ ). In contrast, results from ordinal logistics regression indicates that the level of perceived usefulness of the mobile medium to support administrative processes within the medical practice was significantly lower for males than females, with an odds ratio of .53 (CI 0.33 – 1.39,  $p = .007$ ), holding all other variables constant. Also marginally significant

at the  $p < .1$  level were perceptions of usefulness of the mobile medium assigned to the items “enhance image”, “enhance communication” and “offer additional services”. The odds of male gynecologists perceiving the mobile medium as more useful to enhance the medical practice’s image was 1.53 (CI 0.95-2.25,  $p = .083$ ), to improve the communication with patients in general 1.50 (CI 0.94-2.41,  $p = .089$ ) and to offer additional services to patients 1.56 (CI 0.98-2.48,  $p = .061$ ), holding all other variables constant.

Variable	OR	(95% CI)	p-value
Provide Information in Practice	1.36	(0.86-2.16)	.196
Prepare Patient Encounter	1.59	(1.00-2.52)	.049
Support Communication	1.10	(0.69-1.74)	.694
Conduct Surveys	1.17	(0.74-1.85)	.496
Facilitate Payments	0.85	(0.54-1.33)	.472
Offer Additional Services	1.56	(0.98-2.48)	.061
Send Patient Reminders	1.03	(0.65-1.63)	.895
Permit Communication via SMS	1.00	(0.64-1.58)	.987
Send Information via SMS	1.29	(0.82-2.03)	.271
Obtain New Patients	1.39	(0.88-2.20)	.163
Administration Support	0.53	(0.33-1.39)	.007
Enhance Image	1.53	(0.95-2.25)	.083
Enhance Communication	1.50	(0.94-2.41)	.089
Increase Patient Satisfaction	1.16	(0.73-1.84)	.541

Table 5.7 Effect of gender on perceived usefulness of mobile medium for marketing communication activities and objectives

Notes: OR: Odds Ratio; 95% CI: 95% Confidence Interval; Reference category: females; Adjusted for age group and status or private mobile use; Link function: logit.

## 5.10 Analysis for Research Question #7

The purpose of research question #7 was to determine the influence of a physician’s age group on the perceived usefulness of the mobile medium for a number of activities and objectives. The research question asked: “Does a physician’s age have an influence on gynecologists’ perceptions of the usefulness of the mobile medium?” A preliminary observation of the results from

ordinal logistics regression seems to indicate that gynecologists in different age groups tended to perceive the usefulness of the mobile medium differently. Focusing on the statistically significant results, a number of observations can be made.

First, it appears that physicians in the youngest age group (“under 41 years”) view the usefulness of the mobile medium significantly more positively than those physicians in the reference group as illustrated in table 5.8.

To remind patients via SMS messages of their upcoming appointments or to take their medication, for instance, is from a technological viewpoint limited in complexity, as it could be realized by simply sending the reminder via SMS to a patient’s mobile phone. As exhibited in table 5.11, the youngest physician group was more than 268%  $[(3.68 - 1) * 100]$ , or more than 2.5 times, more likely than physicians in the “over 60” age group to view the usefulness of this specific activity positively (OR 3.68, 1.34 - 10.06,  $p = .011$ ). The feasibility of sending patient reminders via SMS, while limited in complexity, is facilitated by the ubiquity of mobile devices within the general population, including most patients of a physician’s practice. For the same age group, two results were of marginal significance at the  $p < .1$  level. The odds of young physicians perceiving the mobile medium as more useful for permitting patients to communicate via a mobile device with the physician’s practice and as a means to obtain new patients were 2.44 and 2.49, respectively.

Variable	Physician Age Group					
	<41 years		41-50 years		51-60 years	
	OR	95% CI	p-value	OR	95% CI	p-value
Provide Information in Practice	1.79	0.66-4.85	.251	1.19	0.57-2.48	.649
Prepare Patient Encounter	1.37	0.52-3.64	.527	1.43	0.70-2.92	.333
Support Communication	1.15	0.43-3.08	.779	0.97	0.47-1.98	.922
Conduct Surveys	2.25	0.84-6.01	.106	1.58	0.77-3.24	.210
Facilitate Payments	1.30	0.49-3.46	.594	1.29	0.64-2.63	.478
Offer Additional Services	1.41	0.53-3.80	.492	2.25	1.09-4.63	.028
Send Patients Reminders	3.68	1.34-10.06	.011	1.20	0.59-2.47	.612
Permit Communication	2.44	0.91-6.54	.076	1.17	0.57-2.38	.673
Send Information via SMS	2.21	0.83-5.88	.112	1.45	0.71-2.97	.310
Obtain New Patients	2.49	0.92-6.73	.072	1.94	0.94-3.99	.073
Administration Support	1.10	0.40-1.50	.847	0.94	0.45-1.57	.878
Enhance Image	1.83	0.66-5.06	.244	1.87	0.89-3.93	.101
Enhance Communication	1.78	0.65-4.83	.261	1.25	0.60-2.59	.551
Increase Patient Satisfaction	1.54	0.57-4.17	.395	1.85	0.89-3.83	.100
				OR	95% CI	p-value
				1.36	0.66-2.80	.410
				1.04	0.51-2.11	.920
				0.68	0.34-1.39	.296
				1.08	0.54-2.19	.827
				1.05	0.53-2.12	.882
				1.31	0.64-2.66	.459
				0.88	0.43-1.78	.719
				0.95	0.47-1.92	.889
				1.02	0.50-2.07	.959
				1.20	0.59-2.43	.624
				0.62	0.30-1.35	.202
				1.25	0.60-2.59	.558
				1.20	0.58-2.46	.624
				0.94	0.46-1.92	.863

Table 5.8 Effect of age group on perceived usefulness of mobile medium for marketing communication activities and objectives

Notes: OR: Odds Ratio; 95% CI: 95% Confidence Interval; Reference category: > 60 years; Adjusted for gender and status of private mobile use; Link function: logit.

Results for the second youngest age group (41-50 years) also indicate statistically significant and marginally significant results. Respondents in this age group perceived the usefulness of mobile technologies for offering additional services to patients more positive than their older colleagues in the reference group. The odds ratio of 2.25 (OR 2.25, CI 1.09 – 4.63,  $p = .028$ ) indicates that gynecologists in the “41-50” age group were 125%  $[(2.25 - 1) * 100]$  or more than twice as likely to have a more positive perception of the usefulness for offering additional services to patients than their counterparts in the “over 60” age bracket. The odds of 1.94 for gynecologists in the “41-50” age group were marginal significant with a  $p$ -value of .073, indicating that these respondents were almost twice as likely to perceive the mobile medium as more useful than respondents in the reference group, holding all other variables constant.

The influence of age group when compared to the reference category of “over 60 years” appears to diminish the closer the age to the reference group. The odds ratios increasingly converge towards 1, signaling a diminishing difference in how respondents in different age groups differed in their perception of usefulness of the mobile medium. This observation becomes apparent in the “51-60” group. The odds ratios are closer to the value of 1, which would mean no difference, or in this case no influence of age group. Tellingly, no statistically significant results are present in this analysis.

### **5.11 Analysis for Research Question #8**

The purpose of research question #8 was to determine the influence of a physician’s status of private mobile use on the perceived usefulness of the mobile medium for a number of activities and objectives. The research question asked: “Does the status of private mobile use have an influence on gynecologists’ perceptions of the usefulness of the mobile medium?”

The results of ordinal logistics regression exhibited in table 5.9 indicate that those physicians not using the mobile medium for professional purposes (Non-Users) were generally more skeptical regarding the usefulness of the

same for a number of activities and objectives. With the exception of “support communication” and “facilitate payments”, the calculated odds ratios are below one, indicating a lower level of perceived usefulness when compared to those physicians who do use the mobile medium for professional purposes (Users).

Variable	OR	(95% CI)	<i>p</i> -value
Provide Information in Practice	0.70	(0.46-1.06)	.089
Prepare Patient Encounter	0.85	(0.56-1.28)	.443
Support Communication	1.03	(0.69-1.56)	.875
Conduct Surveys	0.84	(0.56-1.26)	.392
Facilitate Payments	1.10	(0.73-1.65)	.644
Offer Additional Services	0.72	(0.47-1.09)	.117
Send Patient Reminders	1.18	(0.78-1.78)	.440
Permit Communication via SMS	0.63	(0.42-0.95)	.027
Send Information via SMS	0.81	(0.54-1.21)	.304
Obtain New Patients	0.71	(0.47-1.08)	.108
Administration Support	0.66	(0.43-1.54)	.053
Enhance Image	0.59	(0.38-0.90)	.015
General Communication	0.56	(0.37-0.85)	.007
Patient Satisfaction	0.64	(0.42-0.98)	.039

Table 5.9 Influence of private mobile use on perceived usefulness of mobile medium for marketing communication activities and objectives  
*Notes: OR: Odds Ratio; 95% CI: 95% Confidence Interval; Reference category: users; Adjusted for gender and age group; Link function: logit.*

Specifically, the odds for Non-Users of perceiving the usefulness of the mobile medium more positively to permit patients to communicate with the physician’s practice is .63 times those of users, holding all variables constant (OR 0.63, CI 0.42-0.95, *p*= .027). Put differently, physicians of the Non-User group were 37%  $[(.69 - 1) * 100]$  less likely than those in the reference group (Users) to evaluate the usefulness of the mobile medium for this particular situation more positively. The more skeptical sentiment of Non-Users is also reflected in their perceived usefulness of the mobile medium to enhance the image of the medical practice (0.59), to enhance the communication with

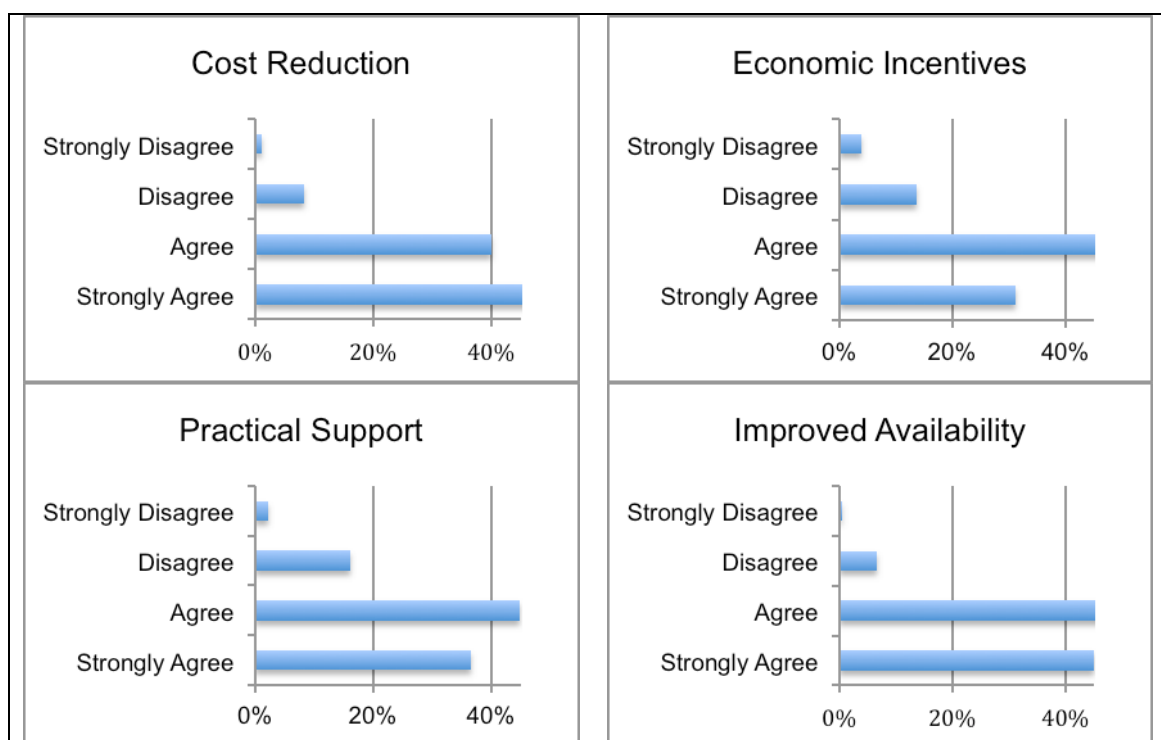


patients in general (0.56) and to contribute to increased patient satisfaction (0.64). Expressed in percentage terms maintaining the same order, Non-Users were 41%, 44% and 36% less likely to view the usefulness of the mobile medium device at a higher level, holding all other variables constant. Marginally significant were the results for “provide info” and “administrative support”, as detailed in table 5.11.

### 5.12 Analysis for Research Question #9

The objective of this research question was to gain an insight into how gynecologists perceived a number of factors or conditions that would facilitate the implementation of the mobile medium into the marketing communication process to existing and potential patients. The research question asked: “What are important perceived facilitators to contribute to increased use of the mobile medium as a marketing communication and CRM tool for this group?”

Figure 5.3 illustrates the frequencies of the answers obtained. The corresponding table showing absolute and relative frequencies is exhibited in the appendix of this document.



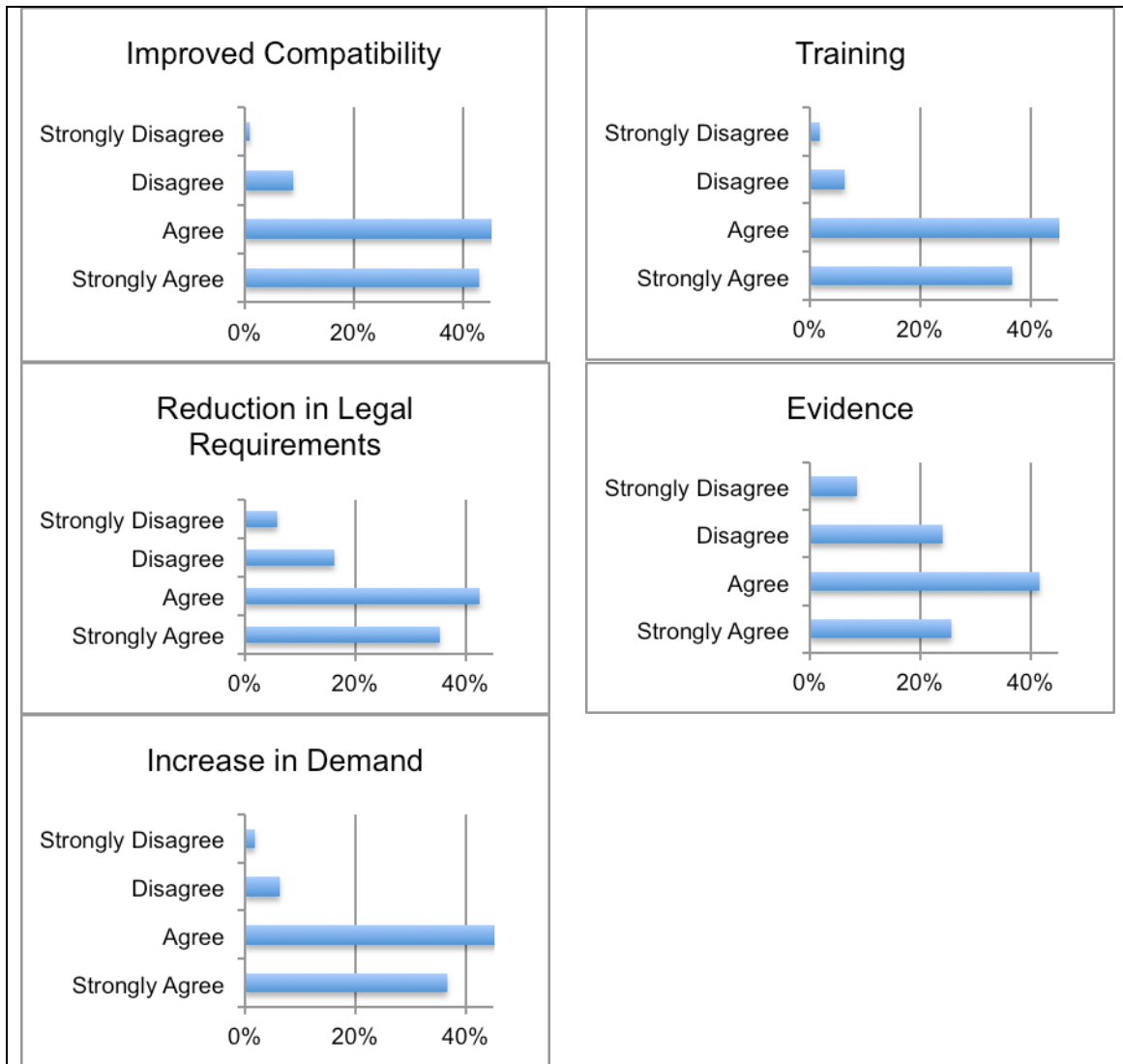


Figure 5.3: Frequency distribution: perceived facilitators

As the descriptive results indicate, all items were deemed to be relevant facilitators by the respondents. In terms of overall level of agreement, combining the respondents answering “agree” and “strongly disagree”, the top 3 facilitators for mobile adoption were “improved availability” (92.7%), “increased demand” from patients (91.7%), and “decreased cost” (91.7%), with the latter registering the highest percentage (50.2%) of “strongly agree” responses of any item on the list. The general perception seems to be that the inclusion of the mobile medium into the marketing communication process represents a significant financial expenditure. Other potential facilitators, particularly “evidence”, “reduction in legal barriers” and “practical support” evoked significantly less agreement than other items. The fact that the presence of evidence supporting

the benefits of the inclusion of the mobile channel evoked the highest level of disagreement (both “disagree” and “strongly disagree”) is somewhat surprising, as the concept of evidence is of particular importance for the healthcare sector in general and physicians in particular.

### 5.13 Analysis for Research Question #10

The purpose of research question #10 was to determine the influence of a physician’s gender on the perceived importance of a number of facilitators to including the mobile medium in communication with existing and potential patients. The research question asked: “Does gender have an influence on a physician’s evaluation of these factors?” Table 5.10 shows the results obtained through ordinal logistics regression.

Variable	OR	95% CI	<i>p-value</i>
Cost Reduction	0.96	(0.59-1.55)	.867
Economic Incentives	0.97	(0.61-1.55)	.901
Practical Support	1.16	(0.73-1.84)	.540
Improved Availability	0.89	(0.55-1.44)	.638
Improved Compatibility	0.89	(0.55-1.43)	.624
Training	0.50	(0.31-0.81)	.005
Higher Demand	1.36	(0.84-2.22)	.215
Evidence	0.78	(0.49-1.23)	.288
Less Legal Barriers	0.70	(0.44-1.11)	.130

Table 5.10 Effect of gender on perceived facilitators

*Notes: OR: Odds Ratio; 95% CI: 95% Confidence Interval; Reference category: females; Adjusted for age group and status or private mobile use; Link function: logit.*

In the evaluation of perceived facilitators, the different odds ratios of male gynecologists, compared to the reference group of female gynecologists, indicate that gender does have an influence. The influence of gender on the “training” category was statistically significant. With an odds ratio of .50 (CI 0.31 – 0.81,  $p = .005$ ), male gynecologists were 50% or half as likely as female respondents to rate practical training at a higher level of agreement. This result seems to indicate that training courses relating to the implementation and use of

mobile technologies in a physician practice would receive significantly more demand from female than from male gynecologists.

#### **5.14 Analysis for Research Question #11**

The purpose of research question #11 was to determine the influence of a physician's age group on the perceived importance of a number of facilitators to including the mobile medium in communication with existing and potential patients. The research question asked: "Does age have an influence on a physician's evaluation of these factors?"

As seen in the analysis of previous similar research questions, the age group of the respondents does indeed seem to have an influence on the answers provided, in this particular case referring to the perceived importance of facilitators as exhibited in table 5.11.

One interesting insight obtained from the results pertains to the influence of age group on the level of agreement of evidence being an important facilitator. In this particular case, age group seems to have an increasingly diminishing effect when compared to the reference group of the "over 60" age group. Put differently, the younger the physicians, the less likely they are to see evidence supporting the effectiveness of using the mobile medium in the communication to existing and potential patients as important. The results indicate that the odds of assigning a higher degree of agreement to "evidence" was .31 (OR 0.31, CI 0.25 – 0.64,  $p = .002$ ) for physicians in the "51-60" age group, .26 (OR 0.26, CI 0.12–0.54,  $p = .000$ ) for physicians in the "41-50" age group and .21 (OR 0.21, CI 0.08-0.58,  $p = .003$ ) for physicians in the "under 41" age group, holding all other variables constant. Calculated in percentages using the formula introduced previously, this translates to a 69% decrease, 74% decrease and 79% decrease in the odds, respectively. In addition, gynecologists in the "51-60" age group were significantly less likely to view "training" as more important (OR 0.45, CI 0.21 – 0.95,  $p = .36$ ) than their peers in the reference group.

Variable	Physician Age Group											
	<41 years				41-50 years				51-60 years			
	OR	95% CI	p-value	OR	95% CI	p-value	OR	95% CI	p-value	OR	95% CI	p-value
Cost Reduction	2.21	0.74-6.59	.154	1.07	0.51-2.26	.866	0.95	0.46-1.99	.899			
Economic Incentives	1.75	0.64-4.82	.279	1.00	0.48-2.08	.989	0.88	0.43-1.83	.741			
Practical Support	1.31	0.49-3.56	.591	1.215	0.59-2.52	.600	0.94	0.46-1.92	.857			
Improved Availability	0.81	0.29-2.26	.683	0.99	0.46-2.10	.973	0.81	0.38-1.70	.576			
Improved Compatibility	1.29	0.46-3.59	.625	1.48	0.70-3.13	.308	1.07	0.51-2.24	.854			
Training	0.50	0.18-1.38	.186	0.70	0.33-1.49	.352	0.45	0.21-0.95	.036			
Patient Demand	1.07	0.38-3.04	.897	0.72	0.33-1.54	.394	0.735	0.35-1.57	.425			
Evidence	0.21	0.08-0.58	.003	0.26	0.12-0.54	.000	0.31	0.15-0.64	.002			
Less Legal Barriers	1.02	0.38-2.73	.974	0.83	0.40-1.70	.608	0.86	0.42-1.76	.683			

Table 5.1.1 Effect of age group on perceived facilitators

Notes: OR: Odds Ratio; 95% CI: 95% Confidence Interval; Reference category: > 60 years; Adjusted for gender and status of private mobile use; Link function: logit.

## 5.15 Analysis for Research Question #12

The purpose of research question #12 was to determine the influence of the status of private mobile use on the perceived importance of a number of facilitators to including the mobile medium in communication with existing and potential patients. The research question asked: “Does the status of private mobile use have an influence on a physician’s evaluation of these factors?”

The odds ratios as expressed in table 5.15 suggest that, in general, gynecologists who were using mobile devices for professional purposes were less enthusiastic about the potential facilitators.

Variable	OR	(95% CI)	p-value
Cost Reduction	0.70	(0.45-1.07)	.100
Economic Incentives	0.79	(0.52-1.20)	.267
Practical Support	0.99	(0.65-1.50)	.961
Availability	0.75	(0.48-1.15)	.183
Compatibility	0.67	(0.44-1.04)	.072
Training	1.14	(0.75-1.75)	.544
Patient Demand	0.53	(0.34-0.82)	.004
Evidence	0.96	(0.63-1.44)	.824
Less Legal Barriers	0.86	(0.57-1.30)	.476

Table 5.12 Effect of private mobile use on perceived facilitators

Notes: OR: Odds Ratio; 95% CI: 95% Confidence Interval; Reference category: users; Adjusted for gender and age group; Link function: logit.

The notable exception here is the higher level of agreement that training would be an attractive factor. However, as the p-value of .544 suggests, the obtained results were not statistically significant. In contrast, the influence of private mobile use appears particularly significant for the perception that demand from patients would represent an important facilitator. Results from ordinal regression logistics indicates that gynecologists belonging to the group of Non-Users were significantly less likely to select a higher level of agreement on “patient demand”, with an odds ratio of .53 (CI 0.34 – 0.82,  $p = .004$ ). “Compatibility” was marginally significant (OR 0.67, CI 0.44-1.04,  $p = .072$ ).

## 5.16 Respondent Characteristics, Questionnaire B (Users)

In total, 100 gynecologists returned the questionnaire aimed at the Users, or those physicians who were already employing the mobile medium to some extent in their medical practices. As illustrated in table 5.13 below, 64% of the respondents were female and 34% were male. In comparison to the Non-User group, a larger percentage (11%) of physicians were in the “under 41” age group, while only 5% were in the “over 60 age” group. A notable difference between the demographic characteristics of both groups is that the percentage of physicians stating they were using the mobile medium privately for professional purposes was significantly higher in the participants completing questionnaire B.

<b>Variables</b>	<b>Category</b>	<b>n</b>	<b>%</b>
<b>Gender</b>	Male	36	36.0
	Female	64	64.0
<b>Age Group</b>	< 41	11	11.0
	41- 50	53	53.0
	51 -60	31	31.0
	> 60	5	5.00
<b>Private Mobile Use</b>	User	85	85.0
	Non-User	15	15.0

Table 5.13 General characteristics of respondents (questionnaire B)  
*Note: n refers to the number of participants*

In the crosstab analysis exhibited in table 5.14 below, the female and male gynecologists were similar in their private use of mobile technologies, with 85.9% and 83% respectively stating they were using the mobile medium privately for professional purposes. These relatively high levels of private mobile use contrast significantly with those of the participants in study 1 (Non-Users). Of the physicians responding to this study, 44.8% of male and 42.3% of female physicians indicated they used the mobile medium for this purpose. Male physicians participating in the study also tended to be older than their female counterparts.

	Male		Female		Total	
	n	Valid %	n	Valid %	n	Valid %
<b>Age group</b>						
< 40	3	8.3	8	12.5	11	11.0
41 - 50	18	50.0	35	54.7	53	53.0
51 - 60	11	30.6	20	31.2	31	31.0
> 60	4	11.1	1	1.6	5	5.00
<b>Private Mobile Use</b>						
User	30	83.3	55	85.9	85	85.0
Non-user	6	16.7	9	14.1	15	15.0

Table 5.14: Crosstab of male and female respondents (questionnaire B)  
*Note: n refers to the number of participants*

A Chi-square test for independence (with Yates Continuity Correction) indicated no significant association between gender and status of private mobile use [ $\chi^2$  (1,  $n = 100$ ) = .003,  $p = .953$ ,  $\phi = -.035$ ]. Also, no significant associations were indicated between age group and status of private mobile use [ $\chi^2$  (3,  $n = 100$ ) = .669,  $p = .880$ ,  $\phi = .082$ ], or gender and age [ $\chi^2$  (3,  $n = 100$ ) = 4.664,  $p = .198$ ,  $\phi = .216$ ].

### 5.17 Analysis for Research Question #13

The purpose of research question #13 was to determine how the responding gynecologists use mobile technologies in their private medical practice, or plan to use them in the future. Given that the mobile medium can still be considered nascent in private gynecologist practices in Germany, the objective of this particular question was to obtain insights about its future use from the minority of physicians already using the medium as a communication platform and channel to existing and potential patients. Figure 5.4 illustrates the absolute values and valid frequencies of the answers provided by the participating physicians.



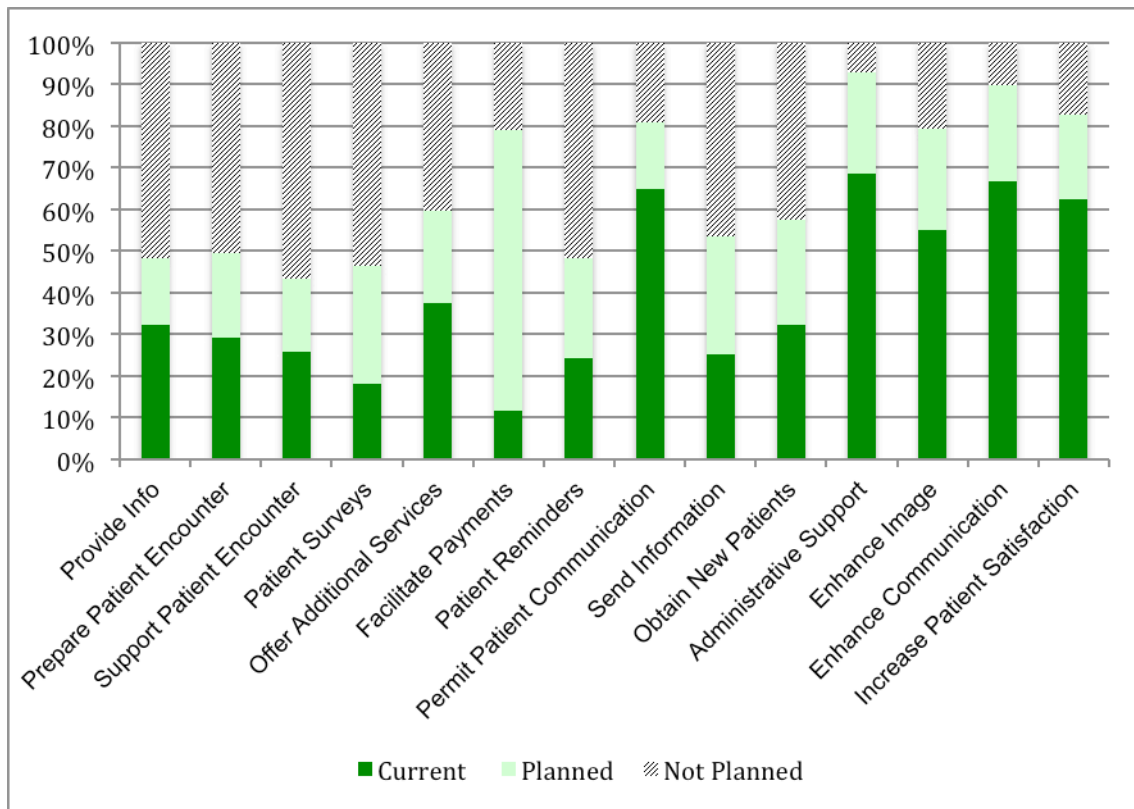


Figure 5.4: Frequency distribution: current, planned and not planned mobile activities

The results of the responses provide a number of interesting insights into the future use of the mobile medium by gynecologists. First, the results indicate that a large majority (81%) of participating gynecologists already permit or plan to permit their patients to communicate via SMS with the medical practice. In this sense, it appears that patients will increasingly be able to use mobile devices, primarily mobile phones, to communicate with physicians or practice staff.

Secondly, the results suggest that almost 60% of physicians perceive the utility of the mobile medium as a marketing channel to offer additional services, as they indicated they were already using or planned to use the mobile medium specifically for this purpose. As previously mentioned, this can be done with a mobile practice app or a practice website optimized for mobile devices. Thirdly, the results also seem to indicate that physicians value the opportunities the mobile medium presents for sending patients information (53.6%). In this sense, the mobile medium could be perceived as taking the role of substitute,

complementary or supplementary communication channel as discussed in chapter 2.

In terms of objectives or desired outcomes, the high “administrative support” percentage (92.9%) reflects the expectation of the respondents that employing mobile technologies and devices in their medical practice will lead to a higher operational efficiency in terms of streamlined administrative processes. From an operational perspective, a private physician’s practice is characterized by a high degree of fixed operating cost, stemming primarily from cost of employees, rent and equipment, whereas variable costs are relatively low. This may be why the issue of operational efficiency is a high priority for physicians in private practice in general.

A large majority of physicians also indicated they already use or planned to use mobile technologies to enhance communication with their existing and potential patients (89.9%) and to increase patient satisfaction (82.8%). A surprising result is the relatively low importance attached to patient reminders. Less than half of the respondents (48.5%) indicated they were using or planned to use the mobile medium specifically for this purpose. The result was surprising as the mobile channel seems to be very well suited for this purpose (e.g., Møldrup, 2007).

#### **5.18 Analysis for Research Question #14**

The objective of this research question was to understand whether demographic factors and the status of private mobile use impact the use of mobile technologies for marketing communication purposes. Specifically, the goal was to investigate the influence of gender, age and status of private mobile use on the respondents’ replies for a number of mobile activities. Given the relatively small sample size and the low numbers of respondents in the youngest and oldest age groups, the age categories of “31-40” and “41-50” were combined to “31-50”, and the age categories of “51-60” and “over 61” were combined to create the age category of “51 and older”. Also, in order to fit with the specific objective of the question, the responses indicating “current” and

“plan to use” were amalgamated into a single response category and subsequently coded in SPSS. Binary logistics regression was then performed to assess impact of the three predictors (gender, age group and status of private mobile use) on physician responses.

As shown in table 5.15, male gynecologists differed from their female colleagues in their usage intention of the mobile medium in private practice, as indicated by the calculated odds ratios. However, as shown by the p-values, none of these differences were statistically significant at the  $p < .05$  level.

Variable	OR	(95% CI)	p-value
Provide Information in Practice	1.50	(0.65-3.48)	.344
Prepare Patient Encounter	1.10	(0.46-2.62)	.830
Support Communication During Encounter	1.48	(0.63-3.48)	.367
Conduct Surveys	1.20	(0.52-2.79)	.672
Facilitate Payments	2.63	(0.80-8.70)	.113
Offer Additional Services	1.97	(0.80-4.86)	.142
Remind Patients	1.52	(0.66-3.52)	.330
Permit Patient Communication	1.62	(0.51-5.12)	.415
Send Information via SMS	1.59	(0.69-3.67)	.277
Obtain New Patients	0.71	(0.30-1.68)	.434
Administration Support	1.09	(0.18-6.54)	.922
Enhance Image	1.15	(0.39-3.33)	.803
Enhance Communication	1.42	(0.33-6.06)	.637
Increase Patient Satisfaction	1.08	(0.35-3.33)	.890

Table 5.15: Logistics regression predicting likelihood of mobile use: effect of gender  
*Notes: OR: Odds Ratio; 95% CI: 95% Confidence Interval; Reference category: females; Adjusted for age group and status of private mobile use.*

As for age group, a demographic factor shown to influence physician responses in a number of the previously presented analyses, the results of the performed logistics regression are exhibited in table 5.16.

Variable	OR	(95% CI)	p-value
Provide Information in Practice	1.24	(0.54-2.87)	.617
Prepare Patient Encounter	0.35	(0.15-0.84)	.019
Support Communication During Encounter	1.56	(0.66-3.70)	.312
Conduct Surveys	1.29	(0.56-3.01)	.551
Facilitate Payments	0.83	(0.28-2.47)	.741
Offer Additional Services	1.04	(0.44-2.49)	.929
Send Patient Reminders	1.62	(0.70-3.74)	.261
Permit Communication via SMS	3.65	(1.23-10.86)	.021
Send Patients Information via SMS	0.76	(0.33-1.76)	.527
Obtain New Patients	1.94	(0.83-4.46)	.127
Support Administrative Processes	7.07	(1.04-47.96)	.045
Enhance Image	1.74	(0.62-4.87)	.293
Enhance Communication	1.28	(0.33-5.01)	.725
Increase Patient Satisfaction	1.40	(0.47-4.18)	.550

Table 5.16 Logistics regression predicting likelihood of mobile use: effect of age group  
*Notes: OR: Odds Ratio; 95% CI: 95% Confidence Interval; Reference category: over 51 years; Adjusted for gender and status of private mobile use.*

Gynecologists in the “31-50” age group were more likely to use or plan to use mobile technologies for a number of activities than their counterparts in the “older” reference group. Specifically, younger physicians were 3.65 times more likely to indicate they currently or planned to permit patients to communicate with the medical practice using SMS messages than their older counterparts. Also, younger physicians were more than 7 times more likely to use or plan to use the mobile medium to support administrative processes within their medical practice than their older colleagues. This finding might suggest that the issue of operational effectiveness is more important to the younger generation of physicians than their older colleagues.

As shown in table 5.17, the status of private mobile use also seems to have an impact on a number of activities for which physicians use or plan to use mobile technologies in communication with their existing and potential patients.

As indicated by the calculated odds ratios, the Non-Users were across the board less likely to use or plan to use the mobile medium for the given range of activities. Focusing on the results statistically significant at the  $p < 0.5$  level, the analysis suggests that Non-Users were significantly less likely to employ the mobile medium for administrative support (OR 0.07, CI 0.01-0.45,  $p = .005$ ), to offer additional services (OR 0.26, CI 0.08-0.85,  $p = .025$ ), to permit patients to communicate via SMS (OR 0.26, CI 0.06-0.80,  $p = .021$ ) and to enhance the practice's image (OR 0.29, CI 0.09-0.97,  $p = .044$ ).

Variable	OR	(95% CI)	p-value
Provide Information in Practice	0.46	(0.14-1.48)	.192
Prepare Patient Encounter	0.30	(0.08-1.01)	.061
Support Communication During Encounter	0.40	(0.12-1.39)	.149
Conduct Surveys	0.36	(0.11-1.21)	.099
Facilitate Payments	0.92	(0.22-3.81)	.911
Offer Additional Services	0.26	(0.08-0.85)	.025
Send Patient Reminders	0.88	(0.29-2.68)	.823
Permit Communication via SMS	0.26	(0.06-0.80)	.021
Send Information via SMS	0.97	(0.32-2.99)	.973
Obtain New Patients	0.34	(0.10-1.12)	.076
Administration Support	0.07	(0.01-0.45)	.005
Enhance Image	0.29	(0.09-0.97)	.044
Enhance Communication	0.35	(0.08-1.56)	.170
Increase Patient Satisfaction	0.33	(0.09-1.13)	.078

Table 5.17 Logistics regression predicting of mobile use: effect of private mobile use  
*Notes: OR: Odds Ratio; 95% CI: 95% Confidence Interval; Reference category: users; Adjusted for gender and age group.*

### 5.19 Analysis for Research Question #15

The objective of this research question was to understand the gynecologists' experiences using mobile technologies in their communication process. To facilitate comprehension, the results exhibited are grouped in the areas of the patient encounter; patient behavior; operational efficiency;

marketing and sales support; general communication; and image and patient satisfaction as exhibited in figures 5.5 – 5.10.

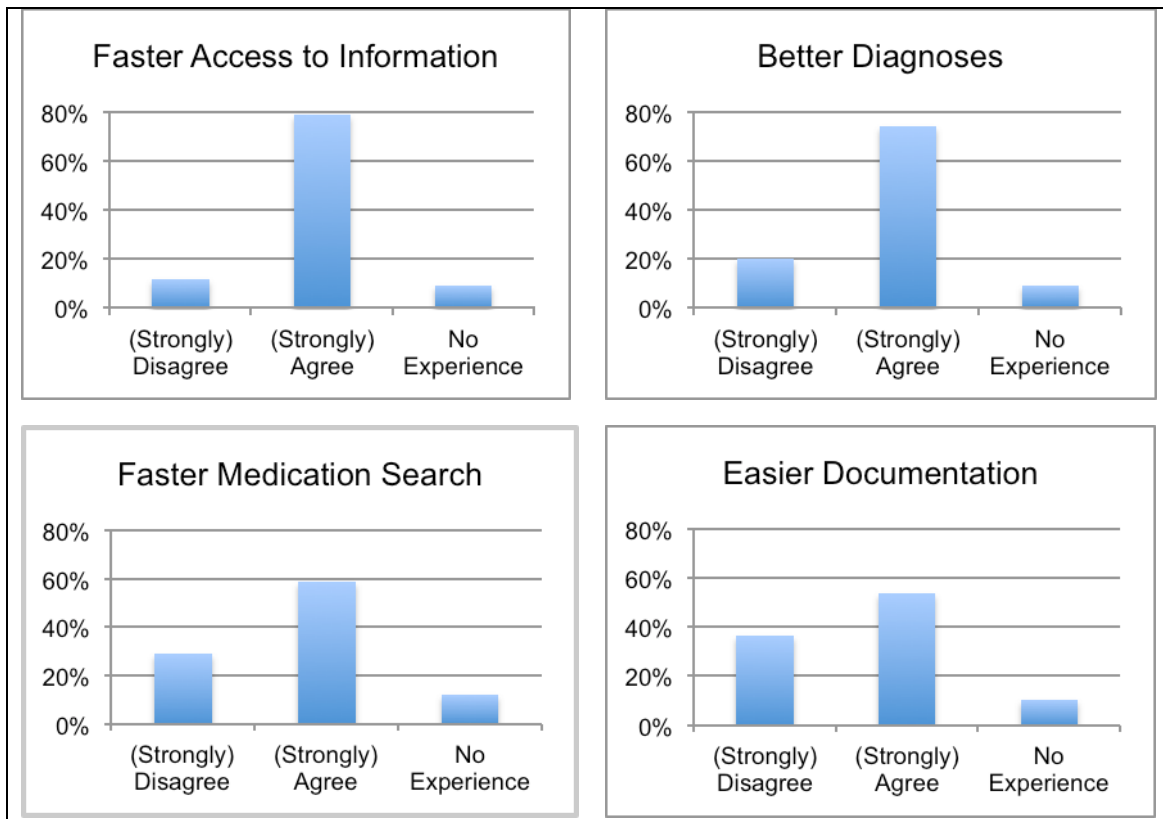


Figure 5.5 Frequency distribution: physician experiences – patient encounter

*Note: Combined response categories*

The exploratory results of the self-reported experiences using mobile technologies indicate that the overall experience, as perceived by the responding gynecologists, has been predominantly positive. However, significant differences exist. As for experiences related to the use of the mobile medium for the patient encounter, a key moment in the physician – patient relationship, a number of interesting results appear. Over 78% of gynecologists seem to agree that mobile technologies allow for faster access to patient information before the encounter. A mobile tablet device seems to be well suited for accessing patient data on the practice’s server. On the other hand, less than 54% found the mobile medium suitable for documentation purposes, in this case the patient encounter. As mobile devices in general are hindered by a limited physical size of user interface, this result might not be surprising. The

use of a mobile device for data input into the data system of a medical practice also requires software and system compatibility between the mobile input device and the practice information system. The notion that mobile technologies are particularly useful as a diagnosing support tool also registered relatively high rates of agreement (70.4%). Considerably less positive were the evaluations in terms of medication search, for which significantly less (58.6%) of respondents reported positive experiences.

As for the physician’s experiences in the category labeled “patient behavior” for this analysis, a very different picture appears as detailed in figure 5.6. According to the respondents, the use of mobile technology has, at least in their opinion, so far not resulted in patients providing more feedback (38%), calling the practice less frequently (29.3%) or changing the practice less frequently (19.6%). The items in this specific category also registered the highest response rate for “no experience” answers.

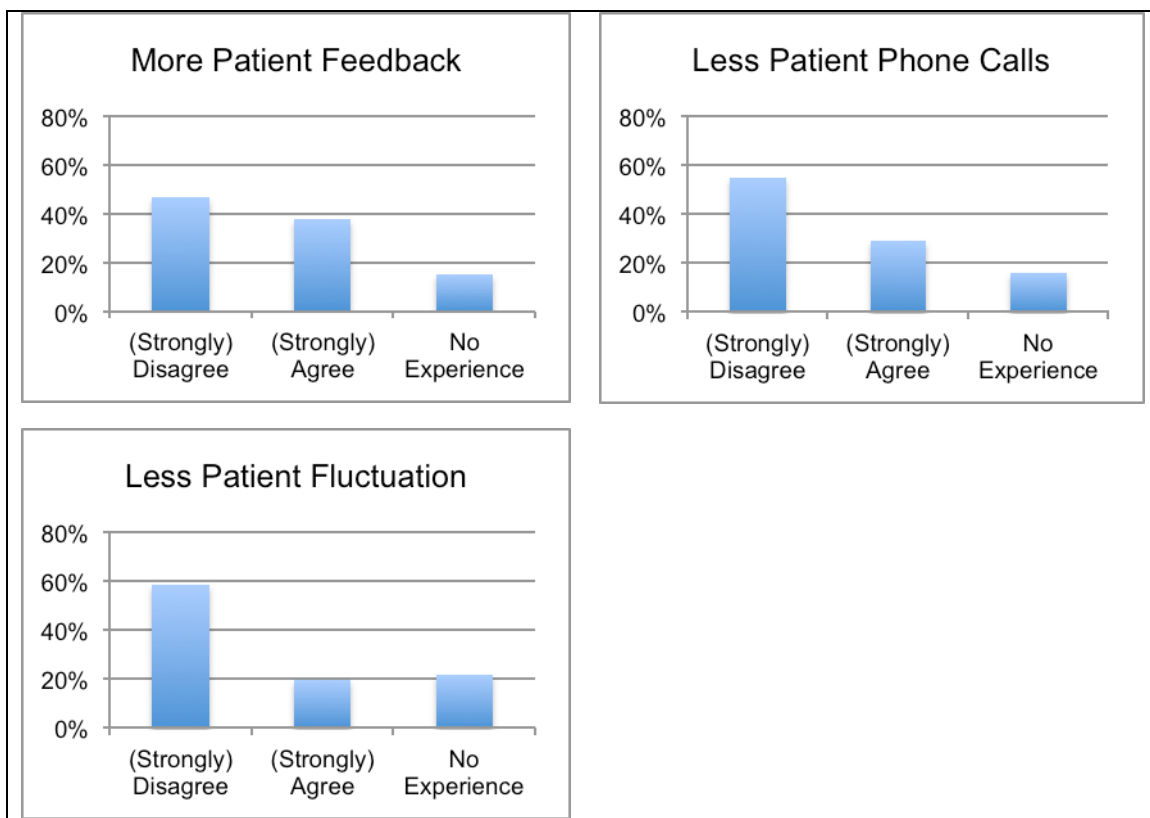


Figure 5.6 Frequency distribution: Physician experiences – patient behavior  
*Note: Combined response categories*

However, it is important to point out that these reported experiences are those of the physicians themselves, and not of their practice staff.

In the “operational efficiency” group, detailed in figure 5.7, two of the three sets of answers seem to warrant the notion that mobile technologies have a positive effect on operational efficiency in an organizational context. The underlying aspect of efficiency in an organizational service context is the reduction of time necessary to perform certain administrative tasks. Over 68% of responding physicians indicated they saw the use of mobile technologies as conducive for administrative processes such as scheduling, while almost 71% saw time-savings in the patient encounter. Interestingly, these elements of increased operational efficiency apparently have not translated into shorter waiting times for patients.

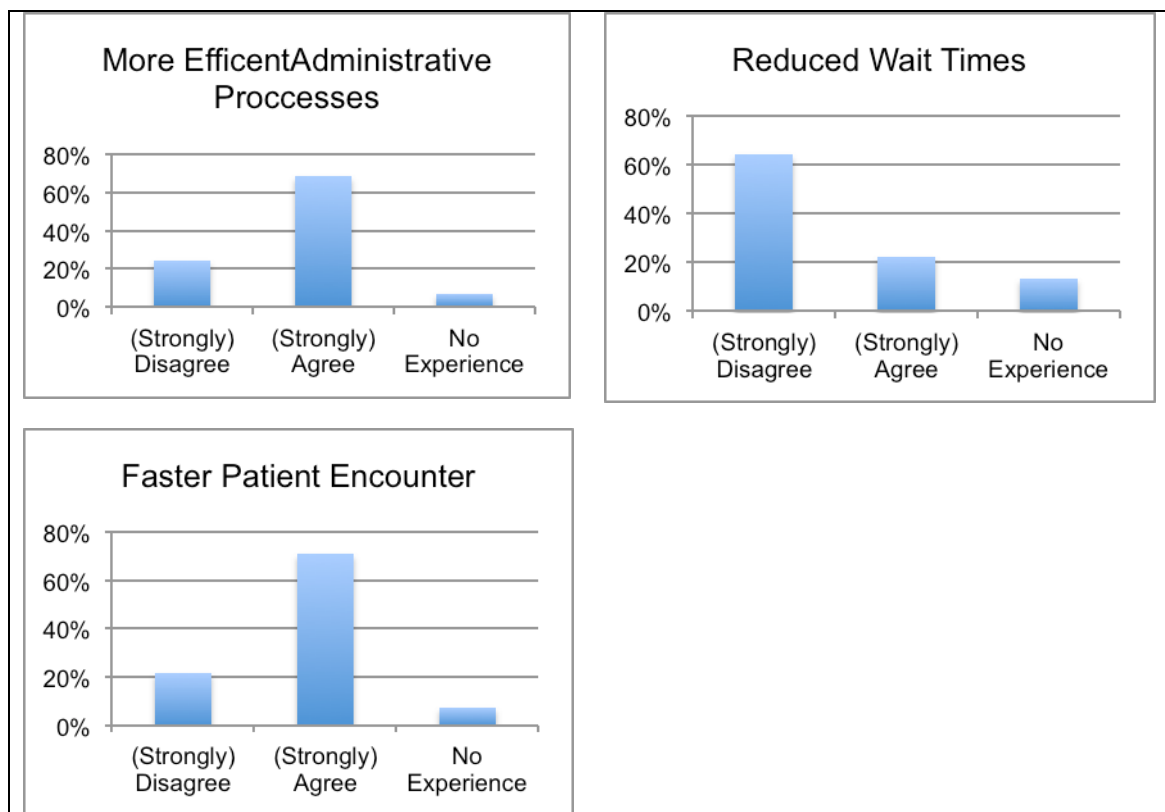


Figure 5.7 Frequency distribution: physician experiences – operational efficiency

*Note: Combined response categories*



Unexpectedly, a significant percentage of respondents agreed or strongly agreed with the notion that the mobile medium was effective for obtaining new patients through listings in mobile physician directories (69.7%) as illustrated in figure 5.8. However, fewer gynecologists (59.6%) agreed or strongly agreed with the notion that the use of mobile technology was suited to offering additional services.

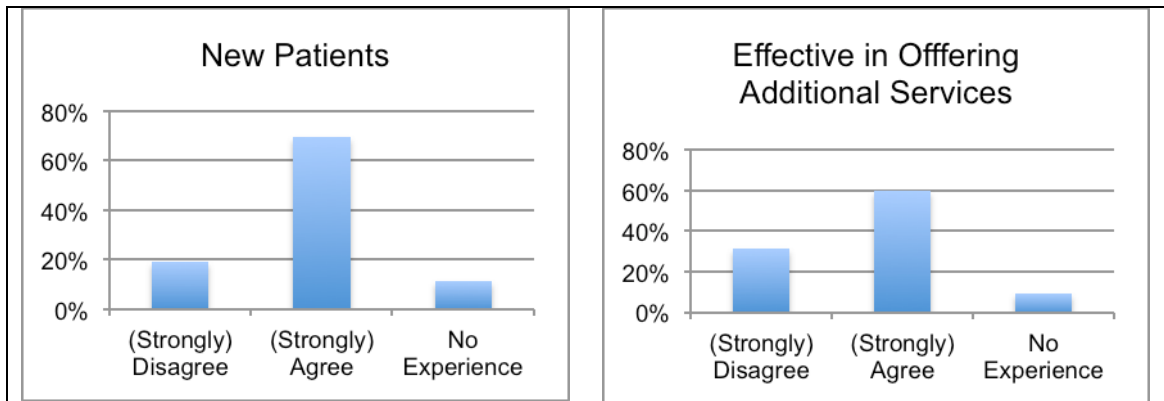


Figure 5.8 Frequency distribution: physician experiences – marketing and sales support  
*Note: Combined response categories*

As illustrated in figure 5.9, the positive overall evaluation of the experiences resulting from the use of the mobile medium seems to be confirmed both in terms of flexibility (71.7%) as well as well as an improvement of the overall communication with patients (66%).

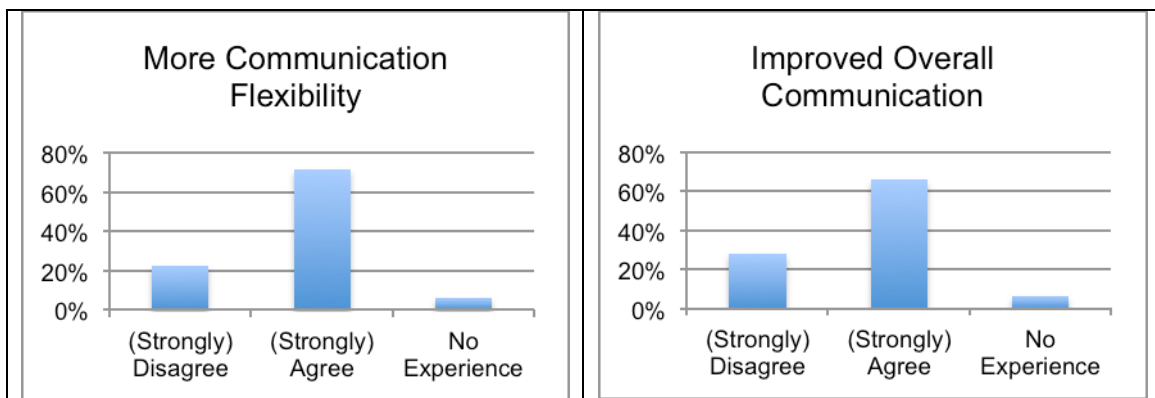


Figure 5.9 Frequency distribution: physician experiences – general communication  
*Note: Combined response categories*

Finally, as depicted in figure 5.10, the two key objectives of enhancing the image of the medical practice and to create higher patient satisfaction, were evaluated as being positively affected by the use of the mobile channel. Whereas over 70% of the respondents saw the use of mobile technologies leading to an improvement of the medical practice’s image, while over 62% agreed or strongly agreed with the notion that the use of the mobile medium has led to an increase in patient satisfaction.

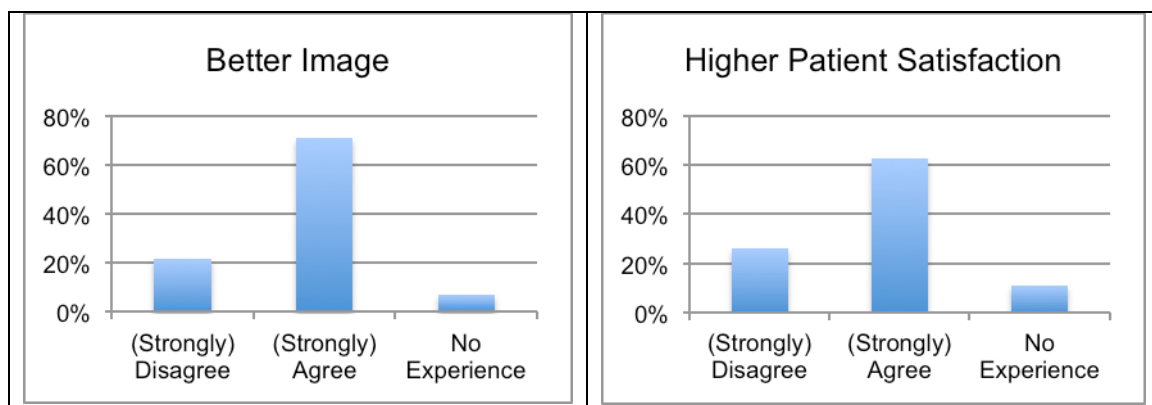


Figure 5.10 Frequency distribution: physician experiences – image and patient satisfaction  
*Note: Combined response categories*

## 5.20 Analysis for Research Question #16

The objective for research question #16 was to investigate the association between the present use of a number of mobile activities and the likelihood of reporting a positive experience, as expressed in “agree” and “strongly agree” responses, as a result of using the mobile medium. Specifically, we were interested in determining associations between a number of mobile activities and the reported change in “patient satisfaction” as expressed with either agree or strongly agree answers. The particular interest in “patient satisfaction” was due to the importance of this factor as discussed in chapter 3 of this report.

In order to determine those activities which had a statistically significant association with reported patient satisfaction, the logistics regression procedure was performed repeatedly, in each iteration trimming the predictor with the

highest p-value. This procedure was performed until only those variables included in the model were statistically significant or marginally significant. The final model is reported in table 5.18 below.

Variable	OR	(95% CI)	p-value
Offer Additional Services	0.34	(0.11-1.07)	.065
Permit Communication via SMS	0.29	(0.10-0.85)	.023
Send Information via SMS	0.10	(0.01-0.80)	.031

Table 5.18 Logistics regression predicting likelihood of experiencing increased patient satisfaction

Notes: OR: Odds Ratio; 95% CI: 95% Confidence Interval; Reference Category: "Currently Using"

The odds ratio of 0.34 (OR 0.34, CI 0.11-1.07,  $p = .065$ ) indicates that gynecologists who were not using the mobile medium to offer additional services were 64%  $[(0.34-1)*100]$  less likely to experience an increase in patient satisfaction than those gynecologists who already did so.

The analysis revealed even stronger associations of patient satisfaction with permitting patients to communicate via SMS and sending information to patients. Specifically, those physicians not yet permitting their patients to communicate with the physician's practice were over 70%  $[(0.29-1)*100]$  less likely to report a perceived increase in patient satisfaction than those physicians who did. Likewise, the former group was 90%  $[(0.1-1)*100]$  less likely to agree that they had seen higher patient satisfaction in their medical practice resulting from the use of mobile technologies. Whereas this particular topic will require more research, this first glance as to what activities might contribute to increased patient satisfaction, as perceived from the viewpoint of a physician, should be of interest.

## **CHAPTER 6**

### **DISCUSSION, IMPLICATIONS AND LIMITATIONS**

#### **6.1 Introduction**

Rapid advances in the presence and application of mobile technologies and devices will very likely continue among individuals, professional groups and entire industries around the world. The mobile medium, already considered the 7<sup>th</sup> mass medium by Ahonen (2008), has changed the way people communicate, receive and disseminate information, conduct business and share their experiences. While marketers in some industries already use the mobile medium rather extensively, other industries, firms and professional groups are just starting to discover the possible applications and implications arising from the rapid proliferation of mobile technologies and devices.

Physicians, of all specialties, working out of their own medical practices, are only slowly discovering the mobile medium for communication with existing and potential patients. The topic of mobile marketing, including mobile customer relationship management (mCRM), is likely to become a topic of increasing interest for this particular professional group. Further advances in mobile technologies are already changing the healthcare industry as a whole, and will increasingly change how physicians in private practice will interact with existing and potential patients.

This research has developed and explored a number of issues related to the use of mobile technologies and devices for marketing communication and CRM purposes by physicians in private practice. In the context of what some have called “the mobile revolution”, the topic of mobile technologies in general, and the application for marketing communication purposes in particular, is attracting increasing attention by practitioners and researchers alike. Taking into consideration the macro-drivers which are leading to an increased use of the mobile medium in the physician in private practice context, the importance of understanding particular issues related to this topic will increase as well.

The research presented here is, to the best knowledge of the author, the first attempt to specifically study issues of mobile marketing in the physician in private practice context. Previous academic research, as discussed in chapters 2 and 3, has primarily focused on either more theoretical areas of mobile marketing phenomena, or on specific industries such as banking. As explained in the opening chapter, the endeavor of this research was to extend the academic and practical discussion of issues related to the mobile medium to a specific professional group. As we believe that physicians in private practice play a fundamental role in society, this focus seemed justified.

This study has attempted to shed some light on a number of specific areas of interest associated with the use or non-use of the mobile medium in the physician in private practice context. A total of 427 gynecologists in private practice in Germany participated in this research study. Two distinct research instruments were developed for this study, one focusing on physicians not using the mobile medium in their communication with existing and potential patients, and one focusing on those physicians who already do so. Of the 2181 physicians successfully contacted, 327 (76%) indicated they were not using mobile technologies and 100 (24%) indicated they already did so to some degree. Descriptive statistics, cross-tabulation analysis and ordinal and direct logistics regression analysis were used to understand the obtained results. SPSS (20.0) software was used for frequency calculations, cross-tabulations, and ordinal and binary logistics regression.

The research questions for the group of Non-Users focused on three specific areas: reasons for non-use (equivalent to adoption barriers), perceived usefulness of mobile technologies for certain communication activities relevant for a private medical practice, and the perceived importance of a number of real and hypothetical facilitating factors for the implementation of mobile technologies. For all areas, the actual quantitative results were of interest, as well as the results obtained through ordinal logistics regression to investigate the influence of gender, age group and status of private mobile use by the physicians on the answers provided. The investigation of age and gender was deemed particularly interesting given the broader context of the German

healthcare system, which is currently witnessing important demographic changes, as indicated by the German Medical Association (Bundesaerztekammer, 2012) and Kopetsch (2010).

The research questions for the second group of physicians, those who already employ the mobile medium as a communication channel with existing and potential patients, focused on two primary areas. The first area of interest was related to specific uses and applications of the mobile channel by the physicians in terms of current, planned and not planned use. The objective was to obtain a snapshot of the present and also a look into the potential future use of this medium. The second area of interest was related to the experiences that physicians perceived as a result or consequence of the use of mobile technologies in their medical practices.

## **6.2 Discussion of Research Results of Questionnaire A (Non-Users)**

Our research revealed that a significant number of German gynecologists in private practice do not presently use the mobile medium in their medical practices. 76% of all responding physicians indicated they were not using the mobile medium for said purpose.

Focusing on the barriers, or the reasons why the participating physicians were not using mobile technologies in their medical practice, a number of interesting insights resulted. The primary barrier as reported by the participating physicians was found to be the lack of time, a common characteristic of this particular profession. This result might be related to findings of previous studies claiming that physicians tend to keep many non-physician clinical tasks to themselves in order to manage their risk as small business owners (Ludwick and Doucette, 2009).

Perceived complexity and lack of information seem to further contribute to the relative low level of adoption of the mobile medium for said purpose. Perceived risk arising from legal concerns is an issue with two facets. One stems from the multitude of laws and regulations that regulate and limit a physician's marketing communication activities in the German market as noted

in chapter 3. As indicated by research carried out by Obermann and Müller (2011) in Germany, a large proportion of physicians seem to be uncertain about the legal regulations. The second facet of this issue stems from legal concerns arising from the transmission and potential misuse of private patient data. While this issue is valid in the discussion of the adoption and use of electronic health records (EHR) (e.g., DesRoches, et al., 2008), for instance, it is doubtful that the marketing communication activities as described in chapter 3 would actually merit the high level of legal concern expressed in this context. However, taking into account that physicians perceive risk stemming from legal issues relating to employing the mobile channel, a clarification of legal issues arising from the use of the mobile medium for marketing communication and CRM purposes should be elaborated by either legal experts or lawmakers.

The perception of complexity has been found a major deterrent to the use or adoption of new technologies in general (e.g., Davis, 1989). However, based on our discussion of feasible mobile activities for physicians in chapter 3, we believe that the mobile medium allows for a large variety of activities of limited technological complexity. The creation of a mobile-optimized practice webpage, the development of a mobile practice app, the sending or receiving of SMS messages to or from patients, and the use of a mobile tablet device to prepare or enhance the patient encounter, for example, are activities of relatively low complexity. It seems plausible to suggest that the high importance attached to the issue of complexity might in effect indicate a lack of understanding of the mobile opportunities available to physicians in private practice. This notion is confirmed by having over 54% of respondents signaling their agreement that the lack of information was a reason for not already employing the mobile channel.

Perceived cost also ranked high in the physician's evaluation of adoption barriers. But as Friedrich, et al. (2009) claim, using the mobile medium for marketing communication purposes is less and less a domain of large companies with vast marketing budgets. As the cost of mobile devices, software and applications continues to decline, this perceived barrier is likely to diminish as well. However, for a physician in private practice in Germany, expenditures

for personnel are among the key cost drivers. Any additional time expenditure caused by the inclusion of the mobile medium, both real and perceived, will continue to present an adoption barrier in the future, unless mobile software or systems become available to help to minimize the time staff uses the mobile channel in the practice's communication with existing and potential patients. The findings also show that a significant percentage of participating gynecologists (63.6%) either agreed or strongly agreed with the notion that the lack of usefulness of the mobile medium for the given purpose played a role in their decision not to use it. This result was surprising, given the multitude of uses and potential benefits of the mobile medium to improve communication of any type of organization with their customers or, in this case, patients. This result may indicate that physicians in private practice are not aware of all mobile opportunities available to them.

As a second step in the analysis, ordinal logistics regression was performed to determine the way in which the factors of gender, age group and status of private mobile use affected the gynecologists' reasons for not employing mobile technologies in communication with existing and potential patients. The results indicate that a number of these predictor variables were associated with different levels of agreement to a number of adoption barriers provided in the research instrument. Though a physician's gender did not appear to have a major influence on these adoption barriers in general, male gynecologists were marginally ( $p < .1$ ) less likely to rate the adoption barrier "Perceived Risk" in a higher response category than their female colleagues (OR 0.69, CI 0.41-1.00,  $p = .052$ ). In contrast, male gynecologists were marginally more likely (OR= 1.53, CI =0.97-2.63,  $p = .068$ ) to choose a higher response category for "Lack of Information" as a reason for not employing the mobile medium in their communication with existing and potential patients. Results obtained through ordinal regression analysis also indicate that age group and the status of private mobile use have a stronger influence than gender. The youngest physician group, those younger than 41 years, were significantly less likely to attach a higher level of agreement to complexity as a reason for not employing the mobile channel (OR 0.18, CI 0.07-0.49,  $p = .001$ ).



Physicians not using the mobile medium privately for professional purposes were significantly more likely to do so (OR 1.68, CI 1.12 – 2.54,  $p = .013$ ).

Having obtained a deeper insight into the adoption barriers and the influence of gender, age group and status of private mobile use, the research continued to investigate how this group of Non-Users perceived the usefulness of the mobile medium related to a range of feasible mobile activities and objectives. Again, given that no prior research on this topic is known to exist, the obtained descriptive results provide the basis for future research endeavors. The first general insight obtained from the results seems to support the notion that while this group of physicians is not employing the mobile medium, they still perceive it to be potentially useful for a number of activities. For More than 76% of the respondents believed using mobile devices and technologies in communication with existing and potential patients to be useful or very useful in enhancing the practice's image, while more than 61% felt the same would increase patient satisfaction. Almost the same percentage perceived the mobile medium as beneficial to supporting internal administrative processes. A significant percentage of respondents viewed the mobile medium as useful or very useful to offer additional services to patients (66%), underlining the perception of its suitability for marketing purposes. Also encouraging from is the high or very high perceived usefulness of permitting patients to communicate via SMS with the medical practice (63%), providing information in the waiting room to patients (63%) and using the mobile medium to send patients appointment and other reminders via SMS to their mobile phones (57%). The research results seem to indicate the responding gynecologists generally viewed the mobile medium as useful for a number of purposes even though they are not yet taking advantage of the opportunities presented by the medium themselves.

Male and female gynecologists also differed along a number of other criteria. While male respondents were significantly more likely to rate the usefulness of the mobile medium to prepare the patient encounter more highly (OR 1.59, CI 1.00 – 2.52,  $p = .049$ ), they in contrary were significantly less likely to do so for administration support than their female counterparts (OR .53, CI

0.33 – 1.39,  $p = .007$ ). Results also indicate that a physician's age does seem to have an influence on the perceptions of usefulness of the mobile medium. Younger physicians, particular in the under 41 age group, seemed to have a more positive opinion of the usefulness of the medium than their older colleagues, specifically for permitting patients to send SMS messages from their mobile devices (OR 3.68, 1.34 - 10.06,  $p = .011$ ). Again, the status of private mobile use seemed to have a significant influence on perception of the usefulness of the mobile medium. Non-users were significantly less likely to perceive the utility for the areas of image, patient satisfaction, or even as a medium to enhance communication with the patients in general.

The third and final area of the investigation focused on a number of hypothetical facilitators to stimulate adoption of mobile technologies in physicians' private practices. All items on the list received high response frequencies in both the "agree" and "strongly agree" categories. Decreasing cost, a factor found to be of significant importance in question 1 of the research instrument, recorded the highest percentage of "strongly agree" replies (50.2%), followed by improved availability of mobile solutions facilitating the application of the mobile medium for marketing communication and CRM purposes (45%). Physicians indicated that an increase in demand from patients would be a motivating factor (36.7% strongly agree). This is interesting as it implies that physicians would be likely to respond to demands or suggestions from their patients. In this sense, there seems to be room for a certain degree of "patient activism" on the issue.

The increased compatibility of mobile technologies with existing administrative systems also received high rates of agreement from the participants. The issue of compatibility has to be seen in the context of the market of practice management software in Germany. A statistic provided by the National Association of Statutory Health Insurance Physicians (KBV, 2012) reveals the plethora of currently installed practice management systems in German physicians' practices. While practice management systems such as Medistar, Turbomed and X.isynet dominate the market, a total of 173 different systems were installed as of June 2012 in physician's medical practices in

Germany. This particular research result seems to suggest that developers of practice management software should feel encouraged to develop and offer marketing or CRM modules as previously discussed. Also, over 85% of the respondents indicated that training for themselves or their practice personnel on mobile technologies would encourage the use of them in their medical practice for marketing and CRM purposes. The call for practical assistance for physicians seems to be further strengthened by having 81% of respondents agreeing that practical support in the implementation of mobile initiatives would be of value. Furthermore, results from the ordinal logistics regression seem to indicate that male gynecologists were for instance significantly less likely (OR 0.50, CI 0.31 – 0.81,  $p = .005$ ) to rate the availability of training courses more highly than female gynecologists. Continuing along the same lines, proof of success in using the mobile medium for marketing communication purposes, or evidence in short, seems more essential for older physicians, given the statistically significant findings that the perceived importance of evidence is almost directly related to the age group. The results indicate that the odds of assigning a higher degree of agreement to “evidence” was .31 (OR 0.31, CI 0.25 – 0.64,  $p = .002$ ) for physicians in the “51-60’ age group, .26 (OR 0.26, CI 0.12–0.54,  $p = .000$ ) for physicians in the “41-50” age group and .21 (OR 0.21, CI 0.08-0.58,  $p = .003$ ) for physicians in the “under 41” age group, holding all other variables constant.

As physicians have been found to increasingly use mobile devices for professional purposes (e.g., Manhattan Research, 2012), we believe it is realistic to claim that the number of gynecologists not using mobile devices privately is likely to diminish over time. For this reason, the findings relating to the influences or associations of the status of private mobile use, which produced a number of significant results in our analyses, are likely to diminish over time.

### **6.3 Discussion of Research Results of Questionnaire B (Users)**

Research results obtained from 100 gynecologists answering questionnaire B (Users) provide further insights into the topic under

investigation. In our study, this group represented just over 23% of the total number of gynecologists. It is plausible to consider those 100 physicians as belonging to the pioneers, or at least the early adopters, of the mobile medium for the mobile marketing communication. 85% of this group indicated they were using the mobile medium privately for professional purposes, compared to only 43% of Non-Users. We also observed a difference in terms of gender and age between the two groups, with 64% of the Users being female (compared to 68% of Non-Users) and 64% 50 years of younger (compared to 51%).

The first objective of this research was to obtain an understanding of how this group of physicians was already using the mobile medium or planned to do so in their medical practices. Of equal interest was to understand the reverse, or those activities respondents indicated they would not pursue in the future.

Three general conclusions may be drawn from the obtained results. First, gynecologists in private practice have begun, though on a limited scale, to employ the mobile channel in their communication with existing and potential patients. Secondly, by analyzing current and planned versus unplanned activities, it appears the mobile medium will be used more extensively, but not across the board and not for all activities. Rather, the results hint towards a pinpoint use of this medium for specific applications which are likely to hinge on internal capabilities, restraints and resulting performance expectations.

Thirdly, the results seem to suggest that while a number of CRM and promotion activities are likely to be used, physicians seem to have high expectations for the potential of the mobile medium to enhance operational efficiency. This benefit could be considered an additional "side effect" resulting from the inclusion of mobile initiatives. The apparent importance of operational efficiency as displayed by this group of gynecologists seems to reinforce the insights of Ludwick and Doucette, 2009; Hsu and Ling, 2008; and Valsecchi, Renga and Ragone, 2007, among others.

The activities which the largest percentage of physicians use or plan to use in the future included permitting communication by patients via SMS,

supporting administrative processes, permitting mobile payment options, enhancing the overall communication with patients, enhancing the practice's image and increasing patient satisfaction. The least popular activities were preparing and supporting the patient encounter, providing information in the waiting room of the practice, conducting surveys and sending information to patients via SMS, as detailed in chapter 5. We can conclude that physicians' intended usage of the mobile medium is not necessarily dependent on activity's degree of complexity. For instance, using a mobile tablet device to prepare and support the communication encounter or to administer patient surveys are all activities of low technological complexity, yet it appears that physicians do not feel these activities are worth pursuing.

Interestingly, however, more than 78% of the participating physicians indicated their intention to offer patients the option to make payments from or via a mobile device. Similar to most activities discussed here, offering an additional method of payment constitutes primarily a CRM measure by the physician. In academic research, the issue of mobile payments is primarily discussed as a separate field of academic research (e.g., Chen, 2008; Kim, Mirusmonov and Lee, 2010), but apparently is or will be of greater importance in the general context of mobile marketing.

The three predictor variables, also used in previous analyses, seemed to influence respondents' current or planned use of the mobile medium. Particularly, we were interested if males and females differed in their usage intentions for different mobile activities. Hence, the analyses used the amalgamated categories of current and planned use, while maintaining not-planned use. Results from direct logistics regression analysis indicate that gender, as opposed to other variables, did not seem to have a significant influence on how physicians already use or intend to use the mobile medium. In contrast, age did appear to influence a number of mobile activities. For instance, younger physicians were significantly more likely to permit patients to communicate with the medical practice using SMS messages (OR 3.65, CI 1.23-10.86),  $p = .021$ ), to prepare the patient encounter (OR 1.56, 0.66-3.7,  $p = .019$ ) or to support administrative processes (OR 7.07, CI 1.04-47.96,  $p = .045$ ).

Whether physicians were using the mobile medium privately seemed to have a significant impact on the answers provided. Similar to the results obtained in previous research questions, private non-users of mobile technologies were significantly less enthusiastic and less likely to use or plan to use mobile activities in their communication with existing and potential patients. Statistically significant at the  $p < .05$  level, they were less likely to permit their patients to communicate via SMS, (OR 0.26, CI 0.06-0.80,  $p = .021$ ), to support administrative processes (OR 0.07, CI 0.01-0.45,  $p = .005$ ), to offer additional services (OR 0.26, CI 0.08-0.85,  $p = .025$ ) or to enhance the image of the medical practice (OR 0.29, CI, 0.09-0.97,  $p = .044$ ). The same group was also less inclined to use the mobile medium for a number of other activities, therefore confirming the impression that physicians using the mobile medium privately seem to perceive its potential in the context of their medical practice substantially more positively than those who do not. Again, we believe these insights should be of interest due to their managerial implications, discussed in chapter 6.

In asking gynecologists for their experiences resulting from the use of the mobile medium, a number of interesting insights came to light. From an objective standpoint, the results could be considered a mixed bag of positive and less positive results, as indicated by the physician's indicated level of agreement for a number of possible experiences. In order to facilitate illustration, the range of experiences was subdivided into the loose categories of patient encounter, patient responses, organizational efficiency, sales support, image and patient satisfaction.

Focusing on the patient encounter, a defining moment in the physician-patient relationship-building process, 78% of respondents either agreed or strongly agreed that mobile technologies allow for faster access to patient information before the encounter, while more than 70% did for the ability to faster diagnose their patients. Prerequisite for this activity is the ownership of a mobile device, presumably a mobile tablet device which is used to access information on the practice's information system, review other medical

information using a physician-facing mobile application, or access the internet. Significantly fewer gynecologists agreed that they perceived an advantage in documentation of the patient encounter (less than 54%) and benefits as a diagnosing support tool (less than 59%).

In terms of the effects of mobile technology on items related to patient responses, or put differently, observable patient reaction, a less enthusiastic evaluation resulted. According to the evaluations by the respondents, only 38% agreed or strongly agreed that patients provided more feedback, 29% that patients were calling less frequently, and 19% that patient fluctuation was reduced. It is important to keep in mind, however, that the respondents were the physicians themselves and not their medical staff, who might provide more positive responses to these specific items.

Significantly more positive results were reported on experiences relating to some aspects of operational efficiency in the medical practice. Almost 71% of respondents reported time savings in the patient encounter resulting from the use of the mobile medium, and 68% indicated improvements in administrative processes, such as scheduling. However, the results also appear to indicate that using mobile technologies has not yet reduced wait times for patients, one factor contributing to patient satisfaction according to Tucker (2002).

The overall positive evaluation of experiences using the mobile medium seems to be confirmed in both the positive evaluation on flexibility (71.7%) and improvement of the overall communication with patients (66%). Unexpectedly, a significant percentage (69.7%) of respondents agreed or strongly agreed with the notion that the mobile medium was effective for obtaining new patients through listings in mobile physician directories or search sites. However, fewer gynecologists agreed that the use of mobile technology was suited to offering additional services, an activity for which the mobile device had been perceived as rather useful by the group of Non-Users.

Over 70% of the respondents believed the use of mobile technologies has led to an improvement of the medical practice's image, while 60% agreed

or strongly agreed with the notion that the use of the mobile medium has resulted in an increase in patient satisfaction, both important yet subjective measures.

The results of a direct logistics regression reveal that gynecologists not currently employing the mobile medium to offer additional services (OR 0.34, CI 0.11-1.07,  $p = .065$ ), to permit patients to communicate via SMS (OR 0.29, CI 0.10-0.85,  $p = .023$ ), or to send information via SMS to patients (OR 0.10, 0.01-0.80,  $p = .031$ ) are significantly less likely to report an increase in perceived patient satisfaction. Although the research results may be considered limited in terms of sample size ( $n=100$ ) and preliminary provided that we are investigating a still-developing phenomenon, we believe that they add a valuable piece to the “physician as mobile marketer” puzzle.

#### **6.4 Research Implications**

Developing a more thorough understanding of the issues involved should be a worthwhile endeavor, as they are poised to benefit a number of key stakeholder groups.

First of all, the results of this research should be interesting to physicians themselves. Our research indicates that physicians, in our particular case gynecologists in private practice in Germany, seem to be reluctant to employ the mobile medium in their communication process with existing and potential patients. In other words, most members of this professional group do not seem to be avid mobile marketers just yet. This insight might not be surprising, but given the potential benefits that the inclusion of the mobile medium could produce for both physicians and patients, this research may be beneficial for physicians to improve their understanding of the issue. The, in this dissertation elaborated, overview of feasible mobile activities and segmentation approaches might further help to make the issue of mobile marketing in a physician in private practice context less abstract. On an even more fundamental level, this dissertation might contribute to changing physician’s perception of mobile marketing communication in general, by illustrating that also fundamental



mCRM measures are elements in the mobile marketing universe. As stated by Obermann and Müller (2010): “If medicine would be a common industry with corresponding rules, marketing could be expected to play a prominent role, given the large number of providers without any specific competitive advantage. However, this seems not be the case.” Perhaps the subject and content of this dissertation can contribute to making the validity of this statement obsolete at some point in the future.

Secondly, the research presented here should be of interest to developers of mobile solutions, mobile applications and practice management systems, and other players in the mobile marketing value chain with a justified interest in helping physicians overcome these barriers and finally enter the mobile age. Physicians in private practice have requirements and limitations specific to their professional group which have to be taken into consideration when developing mobile marketing solutions that cater to them. The identification of barriers or factors that are currently preventing a large percentage of physicians from adopting mobile technologies into the communication process with existing and potential patients, either on purely rational or less rational grounds, should prove useful for efforts aimed at overcoming these barriers by tailoring targeted information and solutions to this professional group. At the same time, the understanding of perceived facilitators such as training and practical support in the implementation of mobile solutions, should equally contribute to this goal. For instance, in order to foster mobile marketing applications by physicians in private practice, detailed information in the form of practical articles in physician-specific publications, providing brief, concise and actionable suggestions on how to benefit from the mobile medium in the communication to existing and potential patients, should prove useful. As indicated by the analysis of perceived facilitators, it seems plausible to suggest for example that this professional group would most likely not be adverse to training and practical support. A recent article in the publication “*Frauenarzt*” – the official publication of the Professional Association of Gynecologists in Germany, seems to prove this point. As stated by Albring, 2013) the association begins to offer mobile practice apps to physicians listing their medical practice on the association’s patient portal starting in the summer of 2013. The objective

of these mobile practice apps is, according to the association, to help physicians to enhance their communication with their patients. On a wider scale, this announcement is also proving the point that mobile marketing and applications thereof, are indeed finding their way into physician's practices in Germany.

Understanding the perceived usefulness of a new technology or device for a specific purpose should be helpful for various players in the mobile market to tailor solutions or applications aimed at physicians in private practice. Combined with the insights gained from the pioneers, or those physicians who have started to employ the mobile medium for marketing communication purposes, an even more precise picture about the future of mobile marketing in the physicians in private practice context emerges. For physicians, improving communication with existing and potential patients has to go hand-in-hand with an increase in operational efficiency. Therefore, the inclusion of the mobile medium and the solutions provided or to be developed specifically for this group should be able not only to enhance communication with existing and potential patients, but also to lighten the burden of operational complexity that might otherwise arise.

Whereas understanding the influences of gender and age group of the physicians should permit an even more tailored and efficient approach by 3<sup>rd</sup> parties in developing and offering mobile solutions for medical practices, a second and equally implication has to be acknowledged. Provided that the medical profession in general is increasingly becoming a "female" occupation, the perceptions and preferences of this group is bound to become increasingly important. Also, as significant number of older physicians retire to be replaced by younger colleagues, the characteristics displayed by the younger generation is equally bound to carry more weight in why and how the mobile medium is likely to be employed in this field.

In addition, as the research results indicate, private mobile use by physicians was found to have a significant influence on a number of perceptions of the mobile medium regarding barriers, usefulness, facilitators, or planned

use. As an increasing number of physicians is likely to adopt mobile devices and physician-directed technologies, thus becoming more familiar with the medium itself, it is plausible to suggest that the weight of the “User” category will increase rapidly.

Last but not least, this research should be interesting to the general public, the patients, as we are all likely to benefit from the inclusion of the mobile channel into the communication mix of a professional group we depend upon. Using our mobile devices to find physicians in web directories optimized for mobile viewing, to schedule appointments on the go, or to receive educational or other information from our physicians wherever we are should be a welcome shift in the relationships we form with physicians. As the research results also indicate, physicians do seem take into consideration, at least to some degree, the opinions and demands of their patients, therefore opening the door for a certain degree of “patient activism” to foster the adoption of the mobile medium by physicians. If successful, patients might thereby contribute to enhancing the flow of information between themselves and their physicians, facilitating scheduling or rescheduling among other improvements.

## **6.5 Research Limitations**

As with all academic research, this study has a number of limitations that need to be addressed by the researcher.

First, this study focused exclusively on gynecologists in private practice in Germany. The results obtained also might not be valid for physicians in private practice of other medical specialties, such as pediatrics or ophthalmologists. This limitation is based on two key rationales. First, physicians of different specialties might have dissimilar characteristics, such as average age, percentage of females vs. males, or affinity to mobile technologies, that are more or less conducive to employing the mobile medium as a marketing communication or CRM medium. The second rationale is based on the acknowledgement that the profile of the patients catered to by different

physician groups varies, therefore enhancing or diminishing the suitability of the mobile medium as a marketing communication tool.

Also, the research results may not be generalizable to physicians in private practice in other countries. Incentives provided by the national health care system in which a physician works are also likely to have an effect on the adoption of mobile technologies. Different health care systems provide different incentives to see more patients and determine the overall economic value that can be achieved by private physicians. These systems in return are strongly influenced by government action in terms of policies, regulations or initiatives related to the adoption of technology, as evidenced in the U.S. in the context of Electronic Health Records (EHRs). Even within a purely European context, significant differences exist, as discussed for example by Simonet (2010). Also, physicians are likely to be influenced by the characteristics of the national healthcare systems in which they practice, their education, culture and degree of economic development, among other factors.

In addition, the study was constrained by the limitation of questions we deemed relevant to ask. As physicians in private practice in Germany are generally not considered to be avid participants in academic research studies of this type, the number of questions we were able to pose was limited. However, this limitation should hold true for most research conducted with a professional group that is characterized by high levels of stress and a pronounced lack of time.

## CHAPTER 7

### CONCLUSIONS AND FUTURE RESEARCH AVENUES

#### 7.1 Conclusions

This research has developed and explored a number of research questions related to the use of mobile technologies and devices for marketing communication and CRM purposes by physicians in private practice. Based on the here presented study conducted with physicians in private practice in Germany, the following conclusions may be drawn.

1. The emergence of the mobile medium presents physicians in private practice with a multitude of possible applications for their communication to existing and potential patients. However, gynecologists in Germany are only slowly embracing this technology for this purpose in their private medical practices.
2. The key barriers, or the reasons why physicians are not using mobile technologies in their medical practice, include the lack of time, perceived complexity, the lack of information on the topic and high perceived costs associated with the implementation of mobile technologies.
3. Whereas no significant difference between male and female physicians exist in this regard, both age group as well as the status of private mobile use do seem to have a strong influence on a number of perceived adoption barriers. Specifically, younger physicians were found to be significantly less likely to view the complexity of the mobile medium as an adoption barrier. At the same time, physicians not using the mobile medium privately for professional purposes were significantly more likely to do so.
4. Even though a large percentage of gynecologists in private practice are not yet employing the mobile medium in their medical practice, they do perceive this medium to be beneficial particularly for enhancing their private medical practice's image, to support internal administrative processes, to offer additional services to patients or to provide information in the medical practice's waiting

room, to permit incoming patient communication via SMS and to send patients appointment and other reminders.

5. Significant differences exist in the perception of useful applications between male and female gynecologists, of physicians in different age groups and between those who privately use mobile devices privately and those who do not. For instance, whereas male physicians perceive the mobile medium significantly more positive to be employed in preparing the patient encounter, the opposite is the case in regards to the suitability for the support of administrative purposes. Younger physicians, have a more positive opinion of the usefulness of the medium than their older colleagues, specifically for permitting patients to send SMS messages from their mobile devices. Those physicians not using mobile devices for professional purposes are significantly less likely perceive the utility for the areas of image, patient satisfaction, or even as a medium to enhance communication with the patients in general.

6. Key facilitators likely to contribute to the increased adoption of the mobile medium for marketing communication and CRM purposes include the reduction of cost and the improved availability of mobile solutions facilitating the application thereof. Likewise, the increased compatibility of mobile technologies with existing administrative systems, training and practical support in the implementation of mobile initiatives are of key importance.

7. Male and female gynecologists value these facilitators differently. Particularly training on the use and applications of mobile technologies in the medical practice is deemed significantly more relevant for female than for male physicians. For physicians in the highest age group, evidence proving the effectiveness of mobile medium for given purpose is significantly more important than for their younger colleagues. Physicians exhibiting a greater affinity to mobile technologies, as expressed by their private use of the mobile medium for professional purposes, are more likely to be guided by patient demand for the inclusion of the mobile medium than their less mobile oriented colleagues.

8. The mobile medium is poised to be used more extensively in the communication to existing and potential patients by physicians in private practice, particularly for SMS communication, in support of administrative processes, for payment options and for enhancing practice's image and increasing patient satisfaction. Gynecologists in private practice also have particular high hopes of the utilization of the mobile channel translating into an increase in operational efficiency.

9. Whereas how and for what purposes physicians use or plan to employ the mobile medium in their medical practice can be expected to be similar for both male and female physicians, younger physicians are more likely to permit patients to communicate with the medical practice using SMS messages, to prepare the patient encounter or to support administrative processes. Private non-users of mobile technologies, are likewise significantly less likely to employ the mobile medium in their medical practices to offer additional services, to permit patients to communicate via SMS, for administrative support or for image purposes.

10. Perceived benefits obtained by the inclusion of the mobile medium so far includes the faster access to patient information before the encounter, efficient diagnose support tool, streamlined administrative purposes, improved image and patient satisfaction as well as obtaining new patients through listing in mobile search sites. However, the inclusion of the mobile medium is perceived to have been less effective in increasing patient feedback, reducing wait times and patient calls or reducing patient fluctuations.

**In conclusion, the mobile medium will continue to make inroads into the private medical practices of physicians. As the applications, the understanding and acceptance of this emerging medium are bound to increase, the implications and effects thereof are equally like to play a more prominent role in the marketing communication activities by this important professional group.**

## 7.2 Future Research Avenues

As an academic field of research, mobile marketing consists of a growing number of sub-fields and areas and holds tremendous promise for researchers from the marketing, medical, management and information systems fields. Hopefully this study is just the beginning of a much larger stream of academic research focusing on the healthcare sector in general, and on physicians in private practice in particular.

As this research focused on gynecologists in Germany, we encourage an extension to other physician groups and to additional countries in order to provide for a more global and professional group encompassing insights.

Future research could also expand the items used in the research instrument. Since this research was the first attempt to shed light on specific issues, it is conceivable that other factors play a role and therefore should be considered so that reliable scales and predictive models can be developed.

Other avenues for future research could focus on the specific mobile solutions that currently exist and have the potential to be successfully applied to the physician in a private practice context. As an example, future research may focus on the specific mobile tools such as SMS, mobile optimized webpages, mobile physician search sites or mobile practice apps for physicians in private practice. Consequently, as more physicians are employing them, longitudinal studies might produce some interesting insights on how applications and experiences with the mobile medium change over time.

Another valuable stream of research, both from an academic and practical perspective, would be to understand the patient side of the equation. Marketing activities in general, and mobile marketing activities in particular, are only effective if the intended target accepts these activities, perceives a real value therein, and subsequently carries out the desired action or behavior. As for any successful marketer, understanding the customer, or patient, will be vital



to physicians achieving the desired outcomes by employing the mobile channel successfully.

Additional research should investigate in detail the marketing communication-related objectives of increasing “image” or “patient satisfaction” as determined in this study, and to establish more comprehensive insights from physicians and patients in the context of mobile marketing. An interesting approach, for instance, might be to determine perceptions of how the inclusion of the mobile channel into a physician’s communication mix would be able to achieve these objectives, particularly as seen by the patients.

In the particular case of Germany, another interesting aspect relates to the increasing number of foreign physicians practicing there. Working out of their newly established private practices, or being employed in hospitals, there were 28,355 foreign physicians from EU and non-EU countries practicing in Germany at the end of 2011, according to the German Medical Association (Bundesaerztekammer, 2012). As a recent article in the German magazine Spiegel (2012) reports, the increasing number of foreign physicians practicing in Germany is accompanied by communication challenges between physicians and patients due to insufficient knowledge of German by some. The use of mobile technologies, particularly as an additional communication channel, in this specific context could prove an interesting future research direction as well.

If academic research on Mobile Marketing is still in its infancy, as claimed by Varnali and Toker (2010), then the extension of this research to the professional group of physicians is still in its embryonic stage. Just as a physician can assist in the healthy development of an embryo, a researcher can contribute to the growth of an interesting research subject. Both are worthy endeavors.

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**APPENDIX A**

**EXHIBITS**

**NON-USERS: PHYSICIANS NOT EMPLOYING MOBILE TECHNOLOGIES  
(QUESTIONNAIRE A)**

## Exhibit I

### Questionnaire A – Physicians Currently Not Employing Mobile Technologies in their Medical Practice (German)

1. Wenn mobile Technologien in der Kommunikation mit Ihren Patienten momentan nicht zum Einsatz kommen, was sind hierfür die Gründe? ( ++ Stimme stark zu, + Stimme zu, - Stimme nicht zu, -- Stimme überhaupt nicht zu)

	++	+	-	--
Aus Zeitmangel: Der Aufwand an Zeit ist zu groß mobile Technologie in unserer Praxis einzuführen				
Aus Datenschutzgründen oder anderer rechtlicher Bedenken				
Aus Informationsmangel: Wir haben nicht genug Informationen über das Thema				
Aus Mangel an Nutzen: Der Einsatz mobiler Technologien bringt keinen großen Nutzen				
Aus wirtschaftlichen Gründen: Der Einsatz mobiler Technologien ist zu teuer				
Aus praktischen Gründen: Es ist einfach zu kompliziert diese Technologien einzusetzen				
Aus Mangel an Bedarf von Patientenseite				
Anzahl von Patienten / Praxisgröße rechtfertigt keine Investition in mobile Technologien oder Geräte				
Andere (Bitte angeben)				

2. Angenommen, dass in der Zukunft der Einsatz mobiler Technologien für Arztpraxen wirtschaftlich und praktisch realisierbar wäre, worin sehen Sie den größten Nutzen von mobilen Technologien in der Kommunikation mit Ihren Patienten? ( ++ sehr nützlich, + nützlich, - nicht nützlich, -- überhaupt nicht nützlich)

	++	+	-	--
In der Bereitstellung von Informationen im Wartezimmer der Praxis z.B. durch WIFI				
In der Vorbereitung von Patientengesprächen				
In der Unterstützung des Patientengesprächs während der Behandlung				
Um Patienten an ihre Medikamenteneinnahme oder Therapietreue zu erinnern				
Um Patienten die Kommunikation via SMS oder E-Mails zu ermöglichen				
Zur Durchführung von Patientenbefragungen				
Zur Gewinnung neuer Patienten				
Zur Unterstützung von praxisinternen Verwaltungsabläufen wie. z.B. Terminvergabe, Dokumentation				
Zur Übersendung von aktuellen Informationen via SMS an Patienten				
Um eventuelle Zusatzleistungen (z.B. IGeL Leistungen) den Patienten anzubieten				
Um Image / Außendarstellung zu unterstützen				
Um generell die Kommunikation mit den Patienten zu verbessern				
Um die allgemeine Zufriedenheit der Patienten zu steigern				
Für den elektronischen Zahlungsverkehr z.B. Praxisgebühr oder Zusatzleistungen				
Andere (Bitte angeben)				

3. Bewerten Sie bitte die Faktoren die Ihrer Meinung nach dazu beitragen würden, den Einsatz von mobilen Technologien in Arztpraxen zu ermöglichen oder zu vereinfachen. ( ++ Stimme stark zu, + Stimme zu, - Stimme nicht zu, -- Stimme überhaupt nicht zu)

	++	+	-	--
Sinkende Preise von mobilen Technologien und Software				
Steigende Nachfrage von Patienten				
Wirtschaftliche Anreize bzw. Unterstützung von Seiten der Krankenkassen, Unternehmen oder Staat				
Praktische Unterstützung bei der Installation und Integration z.B. durch die Industrie oder Krankenkassen				
Fundierte Studien, welche die Nutzen für Ärzte wie mich klar belegen				
Wegfall oder Reduzierung rechtlicher Bedenken				
Besseres Angebot einfacher technologischer Lösungen speziell für Arztpraxen				
Bessere Kompatibilität mobile Technologien mit existierender Verwaltungssoftware				
Schulungen für mich und /oder Praxispersonal				
Andere (Bitte angeben)				

3. Altersgruppe des ausfüllenden Arztes:

- 31 – 40 Jahre     
  41 – 50 Jahre     
  51 – 60 Jahre     
  61 oder älter

4. Geschlecht des ausfüllenden Arztes:       männlich       weiblich

5. Nutzen Sie zum jetzigen Zeitpunkt mobile Technologien für private Zwecke? (z.B. zur Abfragung medizinischer Informationen im Internet via Ihres Handys oder zur Verwendung eines mobilen Apps)

- Ja     
  Nein

## Exhibit II

### Questionnaire A – Physicians Currently Not Employing Mobile Technologies in their Medical Practice (English - Translated)

1. If you currently do not employ mobile technologies in the communication with existing or potential patients, please indicate the reasons. (++ Strongly agree, + agree, - Disagree, -- Strongly disagree)

	++	+	-	--
The implementation of mobile technologies in our practice is too time consuming				
Due to legal concerns				
We do not have sufficient information about the topic				
The use of mobile technologies does not produce an important benefit for our practice				
The use of mobile technologies is too expensive				
The use of mobile technologies is simply too complicated				
Due to the lack of demand from our patients				
Due to the lack of sufficient patient numbers				
Other (please specify)				

2. Assuming that in the future the use of mobile technologies for physician's practices would be economically and practically viable, for which purposes do you perceive the greatest benefit and use in the communication with your patients. ( ++ very useful, + useful, - not useful, -- not at all useful)

	++	+	-	--
To provide information in the waiting room area of the practice (for example via WIFI)				
To prepare the patient encounter				
To support the communication with the patient during the encounter				
To send patient appointment or adherence reminders				
To permit patients to communicate via SMS with our practice				
To conduct patient surveys using a mobile device				
To obtain new patients through the listing in mobile physician search sites				
To support internal administrative tasks such as documentation or scheduling				
To send information via SMS to patients				
To offer additional services to patients				
To enhance the image of practice				
To enhance the communication with patients in general				
To increase patient satisfaction				
To enable mobile payments such as consultation or prescription fees				
Other (Please specify)				

3. Please evaluate the different factors that, in your opinion, would stimulate the adoption of mobile technologies in physicians' practices such as yours. (++ Strongly agree, + agree, - Disagree, -- Strongly disagree)

	++	+	-	--
Declining costs				
Increasing demand by patients				
Economic incentives from government, health insurance companies and industry				
Practical support in the implementation				
Studies proving the benefits of mobile technologies for physicians like myself				
Reduction of legal concerns				
Improved availability of easy-to-use technological solutions specifically for physician's practices				
Improved compatibility of mobile technologies with existing administrative software				
Training courses for myself and /or practice employees				
Other (Please specify):				

4. Age group of participating physician:

- 31 – 40 years                       41 – 50 years                       51 – 60 years  
 61 years or older

5. Gender of participating physician :                       Male                       Female

6. Do you presently use mobile technologies privately for professional purposes (for example to access medical information on the Internet using your mobile device or using a mobile application?)

- Yes                       No

### Exhibit III

#### Question 1: Reasons for not Using Mobile Medium – Absolute and Relative Frequency Distribution

Variable	Strongly Disagree		Disagree		Agree		Strongly Agree	
	Absolute	Relative	Absolute	Relative	Absolute	Relative	Absolute	Relative
Lack of Time	23	7.0	58	17.7	146	44.6	96	29.4
High Cost	16	4.9	83	25.4	142	43.4	84	25.7
High Risk	37	11.3	73	22.3	124	37.9	91	27.8
Lack of Usefulness	22	6.7	95	29.1	152	46.5	56	17.1
Complexity	26	8.0	108	33.0	121	37.0	70	21.4
Lack of Information	45	13.8	102	31.2	121	37.0	58	17.7
Lack of Demand	29	8.9	118	36.1	129	39.4	48	14.7
Lack of Patients	73	22.3	114	34.9	91	27.8	42	12.8



## Exhibit IV

### Research Questions #2 - #4: SPSS Variable Legend and Coding

Variable / SPSS label	Description	SPSS Coding
Lack of time/ LoTime_Rec4	The implementation of mobile technologies in our practice is too time consuming	0= Strongly Disagree 1= Disagree 2= Agree 3 = Strongly Agree
Legal concerns/ PerRisk_Rec4	The use of mobile technologies raises legal concerns	0= Strongly Disagree 1= Disagree 2= Agree 3 = Strongly Agree
Lack of information / LoInfo_Rec4	We do not have sufficient information about the topic	0= Strongly Disagree 1= Disagree 2= Agree 3 = Strongly Agree
Lack of utility / LoUtil_Rec4	The use of mobile technologies does not produce an important benefit for our practice	0= Strongly Disagree 1= Disagree 2= Agree 3 = Strongly Agree
High cost / EconCon_Rec4	The use of mobile technologies is too expensive	0= Strongly Disagree 1= Disagree 2= Agree 3 = Strongly Agree
Complexity / ComCon_Rec4	The use of mobile technologies is too complicated	0= Strongly Disagree 1= Disagree 2= Agree 3 = Strongly Agree
Lack of Demand/ LoDem_Rec4	There is not enough demand from our patients	0= Strongly Disagree 1= Disagree 2= Agree 3 = Strongly Agree
Lack of patients/ LoNum_Rec4	Practice size does not permit an investment in mobile technologies or devices	0= Strongly Disagree 1= Disagree 2= Agree 3 = Strongly Agree
Gender/ Physician_Gender	Physician's gender	0 Male 1 Female
Age Group Physician_Age	Physician's age group	0 Under 41 years 1 41-50 years 2 51-60 years 3 over 61 years
Private mobile use / Private_Mobile_Use	Status of private mobile use	0 Non-Users 1 Users

## Exhibit V

### Question 2: Perceived Usefulness of Mobile Medium– Absolute and Relative Frequency Distribution

Variable	Not Useful at all		Not useful		Useful		Very Useful	
	Absolute	Relative	Absolute	Relative	Absolute	Relative	Absolute	Relative
Offer Additional Services	28	8.6	79	24.2	146	44.6	70	21.4
Provide Info in Practice	37	11.3	76	23.2	138	42.2	71	21.7
Permit Communication via SMS	38	11.6	83	25.4	140	42.8	66	20.2
Send Patient Reminders	36	11.0	104	31.8	140	42.8	47	14.4
Prepare Patient Encounter	36	11.0	106	32.4	140	42.8	45	13.8
Conduct Surveys	42	12.8	104	31.8	137	41.9	44	13.5
Permit Payment	59	18.0	90	27.5	131	40.1	47	14.4
Send Information	55	16.8	114	34.9	117	35.8	38	11.6
Communication Support	57	17.4	145	44.3	105	32.1	20	6.1
Improve Image	21	6.4	52	15.9	177	54.1	77	23.5
Internal Admin Support	22	6.7	55	16.8	165	50.5	85	26.0
Enhance Communication	30	9.2	91	27.8	159	48.6	47	14.4
Increase Satisfaction	27	8.3	107	32.7	159	48.6	41	12.5
Obtain New Patients	43	13.1	124	37.9	121	37.0	35	10.7

## Exhibit VI

### Research Questions #2 - #4: Ordinal Regression Analysis Parameter Estimates

		Estimate	Std. Error	Wald	df	Sig.	95% CI	
							Lower Bound	Upper Bound
Lack of Time	[LoTime_Rec4 = .00]	-3.012	.441	46.650	1	.000	-3.876	-2.147
	Threshold [LoTime_Rec4 = 1.00]	-1.526	.402	14.405	1	.000	-2.314	-.738
	[LoTime_Rec4 = 2.00]	.456	.392	1.350	1	.245	-.313	1.225
Location	[Physician_Gender=.00]	-.206	.235	.762	1	.383	-.667	.256
	[Physician_Gender=1.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Physician_Age=.00]	-.892	.507	3.097	1	.078	-1.886	.101
	[Physician_Age=1.00]	-.355	.370	.923	1	.337	-1.080	.369
	[Physician_Age=2.00]	-.094	.365	.067	1	.796	-.809	.620
	[Physician_Age=3.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Private_Mobile_Use=.00]	-.159	.211	.570	1	.450	-.573	.254
[Private_Mobile_Use=1.00]	0 <sup>a</sup>	.	.	0	.	.	.	

Link function: Logit.

a. This parameter is set to zero because it is redundant.

### Perceived Risk

		Estimate	Std. Error	Wald	df	Sig.	95% CI	
							Lower Bound	Upper Bound
Threshold	[PerRisk_Rec4 = .00]	-1.902	.403	22.221	1	.000	-2.692	-1.111
	[PerRisk_Rec4 = 1.00]	-.494	.384	1.653	1	.199	-1.247	.259
	[PerRisk_Rec4 = 2.00]	1.151	.388	8.777	1	.003	.390	1.912
Location	[Physician_Gender=.00]	-.449	.231	3.785	1	.052	-.901	.003
	[Physician_Gender=1.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Physician_Age=.00]	-.023	.490	.002	1	.962	-.984	.938
	[Physician_Age=1.00]	.239	.360	.441	1	.507	-.467	.945
	[Physician_Age=2.00]	.492	.356	1.914	1	.167	-.205	1.189
	[Physician_Age=3.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Private_Mobile_Use=.00]	.066	.206	.104	1	.748	-.338	.471
[Private_Mobile_Use=1.00]	0 <sup>a</sup>	.	.	0	.	.	.	

Link function: Logit.

a. This parameter is set to zero because it is redundant.

### Lack of Information

						95% CI		
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[LoInfo_Rec4 = .00]	-1.928	.403	22.903	1	.000	-2.718	-1.139
	[LoInfo_Rec4 = 1.00]	-.257	.387	.443	1	.506	-1.016	.501
	[LoInfo_Rec4 = 2.00]	1.515	.396	14.643	1	.000	.739	2.292
Location	[Physician_Gender=.00]	.422	.231	3.320	1	.068	-.032	.875
	[Physician_Gender=1.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Physician_Age=.00]	-.343	.500	.473	1	.492	-1.323	.636
	[Physician_Age=1.00]	-.252	.364	.479	1	.489	-.964	.461
	[Physician_Age=2.00]	-.671	.360	3.483	1	.062	-1.376	.034
	[Physician_Age=3.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Private_Mobile_Use=.00]	.352	.207	2.903	1	.088	-.053	.758
[Private_Mobile_Use=1.00]	0 <sup>a</sup>	.	.	0	.	.	.	

Link function: Logit.

a. This parameter is set to zero because it is redundant.

### Lack of Utility

						95% CI		
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[LoUtil_Rec4 = .00]	-2.440	.435	31.441	1	.000	-3.293	-1.587
	[LoUtil_Rec4 = 1.00]	-.353	.393	.806	1	.369	-1.124	.418
	[LoUtil_Rec4 = 2.00]	1.854	.409	20.504	1	.000	1.052	2.657
Location	[Physician_Gender=.00]	.206	.237	.758	1	.384	-.258	.670
	[Physician_Gender=1.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Physician_Age=.00]	-.171	.504	.115	1	.735	-1.159	.817
	[Physician_Age=1.00]	-.148	.371	.159	1	.691	-.874	.579
	[Physician_Age=2.00]	.553	.367	2.268	1	.132	-.167	1.273
	[Physician_Age=3.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Private_Mobile_Use=.00]	.067	.212	.100	1	.752	-.348	.481
[Private_Mobile_Use=1.00]	0 <sup>a</sup>	.	.	0	.	.	.	

Link function: Logit.

a. This parameter is set to zero because it is redundant.

Cost

							95% CI	
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[EconCon_Rec4 = .00]	-2.528	.446	32.159	1	.000	-3.401	-1.654
	[EconCon_Rec4 = 1.00]	-.377	.389	.940	1	.332	-1.140	.386
	[EconCon_Rec4 = 2.00]	1.522	.399	14.563	1	.000	.740	2.303
Location	[Physician_Gender=.00]	-.089	.234	.146	1	.703	-.549	.370
	[Physician_Gender=1.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Physician_Age=.00]	.551	.501	1.210	1	.271	-.431	1.532
	[Physician_Age=1.00]	.580	.367	2.489	1	.115	-.140	1.300
	[Physician_Age=2.00]	.245	.361	.458	1	.499	-.464	.953
	[Physician_Age=3.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Private_Mobile_Use=.00]	.167	.210	.634	1	.426	-.244	.578
[Private_Mobile_Use=1.00]	0 <sup>a</sup>	.	.	0	.	.	.	

Link function: Logit.

a. This parameter is set to zero because it is redundant.

Complexity

							95% CI	
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[ComCon_Rec4 = .00]	-2.799	.430	42.302	1	.000	-3.643	-1.956
	[ComCon_Rec4 = 1.00]	-.600	.390	2.369	1	.124	-1.364	.164
	[ComCon_Rec4 = 2.00]	1.136	.394	8.332	1	.004	.365	1.907
Location	[Physician_Gender=.00]	-.111	.232	.228	1	.633	-.566	.345
	[Physician_Gender=1.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Physician_Age=.00]	-1.708	.510	11.200	1	.001	-2.708	-.708
	[Physician_Age=1.00]	-.596	.367	2.642	1	.104	-1.314	.123
	[Physician_Age=2.00]	-.247	.360	.470	1	.493	-.952	.459
	[Physician_Age=3.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Private_Mobile_Use=.00]	.521	.210	6.178	1	.013	.110	.932
[Private_Mobile_Use=1.00]	0 <sup>a</sup>	.	.	0	.	.	.	

Link function: Logit.

a. This parameter is set to zero because it is redundant.

### Lack of Demand

							95% CI	
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[LoDem_Rec4 = .00]	-1.770	.421	17.665	1	.000	-2.595	-.945
	[LoDem_Rec4 = 1.00]	.391	.398	.970	1	.325	-.388	1.171
	[LoDem_Rec4 = 2.00]	2.358	.421	31.350	1	.000	1.533	3.184
Location	[Physician_Gender=.00]	.188	.235	.642	1	.423	-.272	.649
	[Physician_Gender=1.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Physician_Age=.00]	-.026	.507	.003	1	.959	-1.020	.967
	[Physician_Age=1.00]	.281	.375	.558	1	.455	-.455	1.016
	[Physician_Age=2.00]	.502	.371	1.832	1	.176	-.225	1.228
	[Physician_Age=3.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Private_Mobile_Use=.00]	.374	.210	3.162	1	.075	-.038	.786
[Private_Mobile_Use=1.00]	0 <sup>a</sup>	.	.	0	.	.	.	

Link function: Logit.

a. This parameter is set to zero because it is redundant.

### Lack of Patients

							95% CI	
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[LoNum_Rec4 = .00]	-1.493	.398	14.061	1	.000	-2.274	-.713
	[LoNum_Rec4 = 1.00]	.110	.389	.080	1	.777	-.653	.873
	[LoNum_Rec4 = 2.00]	1.690	.404	17.463	1	.000	.898	2.483
Location	[Physician_Gender=.00]	-.174	.233	.555	1	.456	-.630	.283
	[Physician_Gender=1.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Physician_Age=.00]	-.294	.501	.344	1	.557	-1.275	.688
	[Physician_Age=1.00]	-.673	.366	3.376	1	.066	-1.391	.045
	[Physician_Age=2.00]	-.353	.359	.968	1	.325	-1.057	.350
	[Physician_Age=3.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Private_Mobile_Use=.00]	.450	.209	4.639	1	.031	.041	.859
[Private_Mobile_Use=1.00]	0 <sup>a</sup>	.	.	0	.	.	.	

Link function: Logit.

a. This parameter is set to zero because it is redundant.

## Exhibit VII

### Research Questions #6 - 8: SPSS Variable Legend and Coding

<b>Variable / SPSS label</b>	<b>Description</b>	<b>SPSS Coding</b>
Provide Information in Practice/ ProvideInfo_Rec4	To provide information in the waiting room area of the practice (for example via WIFI)	0= Not Useful at all 1= Not Useful 2= Useful 3 = Very Useful
Prepare Patient Encounter/ PrepEnc_Rec4	For the preparation of the patient encounter	0= Not Useful at all 1= Not Useful 2= Useful 3 = Very Useful
Encounter Communication Support/ ComSup_Rec4	For the support of the communication with the patient during the encounter	0= Not Useful at all 1= Not Useful 2= Useful 3 = Very Useful
Patient Reminders/ PatRem_Rec4	To remind patients to take their medicines or the follow their therapy (adherence)	0= Not Useful at all 1= Not Useful 2= Useful 3 = Very Useful
Permit Patient Communication/ PerCom_Rec4	To permit patients to communicate via SMS	0= Not Useful at all 1= Not Useful 2= Useful 3 = Very Useful
Conduct Patient Surveys/ ConSur_Rec4	To conduct patient surveys	0= Not Useful at all 1= Not Useful 2= Useful 3 = Very Useful
Obtain New Patients/ NewPat_Rec4	To obtain new patients	0= Not Useful at all 1= Not Useful 2= Useful 3 = Very Useful
Administrative Support/ IntAdSup_Rec4	To support internal administrative purposes such as appointment provision, documentation	0= Not Useful at all 1= Not Useful 2= Useful 3 = Very Useful
Send Information/ SendInfo_Rec4	To send relevant information such as newsletters via SMS to patients	0= Not Useful at all 1= Not Useful 2= Useful 3 = Very Useful
Offer Additional Services/ AdServ_Rec4	To offer additional services to patients	0= Not Useful at all 1= Not Useful 2= Useful 3 = Very Useful
Enhance Image/ Image_Rec4	To enhance image of our practice	0= Not Useful at all 1= Not Useful 2= Useful 3 = Very Useful
Enhance Communication/ EnCom_Rec4	To enhance the communication with patients in general	0= Not Useful at all 1= Not Useful 2= Useful 3 = Very Useful
Increase Patient	To increase general patient satisfaction	0= Not Useful at all

Satisfaction/ IncSat_Rec4		1= Not Useful 2= Useful 3 = Very Useful
Payment Support/ MobPay_Rec4	To enable electronic payments such as consultation or prescription fees	0= Not Useful at all 1= Not Useful 2= Useful 3 = Very Useful
Gender/ Physician_Gender	Physician's gender	0 Male 1 Female
Age Group Physician_Age	Physician's age group	0 Under 41 years 1 41-50 years 2 51-60 years 3 over 61 years
Private mobile use / Private_Mobile_Use	Status of private mobile use	0 Non-Users 1 Users



## Exhibit VIII

### Research Questions #6 - #8 Ordinal Regression Analysis Parameter Estimates

		Estimate	Std. Error	Wald	df	Sig.	95% CI	
							Lower Bound	Upper Bound
Threshold	[ProvideInfo_Rec4 = .00]	-1.936	.421	21.109	1	.000	-2.762	-1.110
	[ProvideInfo_Rec4 = 1.00]	-.494	.402	1.515	1	.218	-1.282	.293
	[ProvideInfo_Rec4 = 2.00]	1.413	.409	11.919	1	.001	.611	2.216
Location	[Physician_Gender=.00]	.305	.236	1.672	1	.196	-.157	.768
	[Physician_Gender=1.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Physician_Age=.00]	.583	.508	1.320	1	.251	-.412	1.578
	[Physician_Age=1.00]	.171	.376	.208	1	.649	-.565	.908
	[Physician_Age=2.00]	.305	.369	.680	1	.410	-.419	1.028
	[Physician_Age=3.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Private_Mobile_Use=.00]	-.357	.210	2.885	1	.089	-.768	.055
[Private_Mobile_Use=1.00]	0 <sup>a</sup>	.	.	0	.	.	.	

Link function: Logit.

a. This parameter is set to zero because it is redundant.

		Estimate	Std. Error	Wald	df	Sig.	95% CI	
							Lower Bound	Upper Bound
Threshold	[PrepEnc_Rec4 = .00]	-1.825	.409	19.934	1	.000	-2.626	-1.024
	[PrepEnc_Rec4 = 1.00]	.031	.388	.007	1	.936	-.730	.792
	[PrepEnc_Rec4 = 2.00]	2.086	.409	25.946	1	.000	1.283	2.888
Location	[Physician_Gender=.00]	.464	.236	3.868	1	.049	.002	.925
	[Physician_Gender=1.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Physician_Age=.00]	.316	.499	.400	1	.527	-.662	1.293
	[Physician_Age=1.00]	.355	.367	.936	1	.333	-.364	1.073
	[Physician_Age=2.00]	.036	.362	.010	1	.920	-.672	.745
	[Physician_Age=3.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Private_Mobile_Use=.00]	-.161	.210	.588	1	.443	-.572	.250
[Private_Mobile_Use=1.00]	0 <sup>a</sup>	.	.	0	.	.	.	

Link function: Logit.

a. This parameter is set to zero because it is redundant.

Encounter Communication  
Support

						95% CI		
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[ComSup_Rec4 = .00]	-1.658	.403	16.913	1	.000	-2.448	-.868
	[ComSup_Rec4 = 1.00]	.387	.391	.981	1	.322	-.379	1.153
	[ComSup_Rec4 = 2.00]	2.648	.439	36.447	1	.000	1.788	3.508
Location	[Physician_Gender=.00]	.092	.235	.155	1	.694	-.368	.552
	[Physician_Gender=1.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Physician_Age=.00]	.141	.502	.079	1	.779	-.842	1.124
	[Physician_Age=1.00]	-.036	.368	.010	1	.922	-.757	.685
	[Physician_Age=2.00]	-.380	.364	1.094	1	.296	-1.093	.332
	[Physician_Age=3.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Private_Mobile_Use=.00]	.033	.210	.025	1	.875	-.378	.444
[Private_Mobile_Use=1.00]	0 <sup>a</sup>	.	.	0	.	.	.	

Link function: Logit.

a. This parameter is set to zero because it is redundant.

## Exhibit IX

### Research Question #9: Perceived Facilitators - Frequencies

	Strongly Disagree		Disagree		Agree		Strongly Agree	
	Absolute	Valid%	Absolute	Valid %	Absolute	Valid %	Absolute	Valid %
Improved Availability	2	0.6	22	6.7	155	47.4	147	45.0
Increased Demand	6	1.8	21	6.4	180	55.0	120	36.7
Decreased Cost	4	1.2	27	8.4	130	40.2	162	50.2
Improved Compatibility	3	0.9	28	8.6	153	46.8	141	43.1
Training	7	2.1	40	12.2	170	52.0	109	33.3
Economic Incentives	13	4.0	45	13.8	165	50.5	102	31.2
Practical Support	7	2.1	53	16.2	145	44.3	120	36.7
Reduction of Legal Concerns	19	5.8	53	16.2	139	42.5	116	35.5
Evidence	28	8.6	79	24.2	133	40.7	84	25.7

## Exhibit X

### Research Questions #10 - #12: SPSS Variable Legend and Coding

<b>Variable / SPSS code</b>	<b>Description</b>	<b>SPSS Coding</b>
Decrease in cost/ DecCost_Rec4	Declining costs of mobile technologies and software	0= Strongly Disagree 1= Disagree 2= Agree 3 = Strongly Agree
Increase in demand/ InDem_Rec4	Increasing demand by patients	0= Strongly Disagree 1= Disagree 2= Agree 3 = Strongly Agree
Economic Incentives/ EconInc_Rec4	Economic incentives (i.e support from the government, industry or health insurers)	0= Strongly Disagree 1= Disagree 2= Agree 3 = Strongly Agree
Practical support/ PracSup_Rec4	Practical support in the implementation and integration for example by industry or health insurers	0= Strongly Disagree 1= Disagree 2= Agree 3 = Strongly Agree
Evidence of effectiveness Evid_Rec4	Studies proving the benefits (of mobile technologies) for physicians like myself	0= Strongly Disagree 1= Disagree 2= Agree 3 = Strongly Agree
Reduction in Legal concern RedLegCon_Rec4	Elimination or reduction of legal concerns	0= Strongly Disagree 1= Disagree 2= Agree 3 = Strongly Agree
Improved Availability/ ImprAvail_Rec4	Improved availability of easy-to-use technological solutions specifically for physician's practices	0= Strongly Disagree 1= Disagree 2= Agree 3 = Strongly Agree
Improved Compatibility/ ImprCom_Rec4	Improved compatibility of mobile Technologies with existing administrative software	0= Strongly Disagree 1= Disagree 2= Agree 3 = Strongly Agree
Training/ Training_Rec4	Training courses or information for myself and /or practice employees	0= Strongly Disagree 1= Disagree 2= Agree 3 = Strongly Agree
Gender/ Physician_Gender	Physician's gender	0 Male 1 Female
Age Group Physician_Age	Physician's age group	0 Under 41 years 1 41-50 years 2 51-60 years 3 over 61 years
Private mobile use / Private_Mobile_Use	Status of private mobile use	0 Non-Users 1 Users

## Exhibit XI

### Research Questions #10 - #12: Ordinal Logistics Regression Parameter Estimates

#### Decrease in cost

		Estimate	Std. Error	Wald	df	Sig.	95% CI	
							Lower Bound	Upper Bound
Threshold	[DecCost_Rec4 = .00]	-4.565	.639	51.062	1	.000	-5.817	-3.313
	[DecCost_Rec4 = 1.00]	-2.427	.436	30.981	1	.000	-3.282	-1.573
	[DecCost_Rec4 = 2.00]	-.163	.405	.161	1	.688	-.957	.632
	[Physician_Gender=.00]	-.041	.245	.028	1	.867	-.521	.439
	[Physician_Gender=1.00]	0 <sup>a</sup>	.	.	0	.	.	.
Location	[Physician_Age=.00]	.794	.557	2.030	1	.154	-.298	1.885
	[Physician_Age=1.00]	.064	.382	.028	1	.866	-.684	.813
	[Physician_Age=2.00]	-.048	.376	.016	1	.899	-.785	.690
	[Physician_Age=3.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Private_Mobile_Use=.00]	-.364	.222	2.698	1	.100	-.798	.070
	[Private_Mobile_Use=1.00]	0 <sup>a</sup>	.	.	0	.	.	.

Link function: Logit.

a. This parameter is set to zero because it is redundant.

#### Economic Incentives

		Estimate	Std. Error	Wald	df	Sig.	95% CI	
							Lower Bound	Upper Bound
Threshold	[EconInc_Rec4 = .00]	-3.347	.479	48.733	1	.000	-4.286	-2.407
	[EconInc_Rec4 = 1.00]	-1.690	.412	16.801	1	.000	-2.497	-.882
	[EconInc_Rec4 = 2.00]	.644	.401	2.583	1	.108	-.141	1.429
	[Physician_Gender=.00]	-.030	.240	.016	1	.901	-.501	.441
	[Physician_Gender=1.00]	0 <sup>a</sup>	.	.	0	.	.	.
Location	[Physician_Age=.00]	.559	.517	1.170	1	.279	-.454	1.572
	[Physician_Age=1.00]	-.005	.377	.000	1	.989	-.744	.734
	[Physician_Age=2.00]	-.123	.372	.109	1	.741	-.852	.606
	[Physician_Age=3.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Private_Mobile_Use=.00]	-.239	.215	1.234	1	.267	-.661	.183
	[Private_Mobile_Use=1.00]	0 <sup>a</sup>	.	.	0	.	.	.

Link function: Logit.

a. This parameter is set to zero because it is redundant.

## Practical Support

						95% CI		
		Std.				Lower	Upper	
		Estimate	Error	Wald	df	Sig.	Bound	Bound
Threshold	[PracSup_Rec4 = .00]	-3.700	.536	47.663	1	.000	-4.751	-2.650
	[PracSup_Rec4 = 1.00]	-1.366	.403	11.504	1	.001	-2.156	-.577
	[PracSup_Rec4 = 2.00]	.662	.396	2.795	1	.095	-.114	1.438
Location	[Physician_Gender=.00]	.146	.237	.375	1	.540	-.320	.611
	[Physician_Gender=1.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Physician_Age=.00]	.273	.508	.288	1	.591	-.723	1.269
	[Physician_Age=1.00]	.195	.372	.275	1	.600	-.534	.924
	[Physician_Age=2.00]	-.066	.367	.032	1	.857	-.785	.653
	[Physician_Age=3.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Private_Mobile_Use=.00]	-.010	.212	.002	1	.961	-.426	.405
[Private_Mobile_Use=1.00]	0 <sup>a</sup>	.	.	0	.	.	.	

Link function: Logit.

a. This parameter is set to zero because it is redundant.

## Improved Availability

						95% CI		
		Std.				Lower	Upper	
		Estimate	Error	Wald	df	Sig.	Bound	Bound
Threshold	[ImprAvail_Rec4 = .00]	-5.410	.814	44.201	1	.000	-7.004	-3.815
	[ImprAvail_Rec4 = 1.00]	-2.847	.451	39.764	1	.000	-3.731	-1.962
	[ImprAvail_Rec4 = 2.00]	-.103	.408	.063	1	.801	-.902	.697
Location	[Physician_Gender=.00]	-.116	.245	.222	1	.638	-.597	.365
	[Physician_Gender=1.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Physician_Age=.00]	-.215	.525	.167	1	.683	-1.244	.815
	[Physician_Age=1.00]	-.013	.386	.001	1	.973	-.769	.743
	[Physician_Age=2.00]	-.212	.380	.312	1	.576	-.957	.532
	[Physician_Age=3.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Private_Mobile_Use=.00]	-.293	.220	1.771	1	.183	-.725	.139
[Private_Mobile_Use=1.00]	0 <sup>a</sup>	.	.	0	.	.	.	

Link function: Logit.

a. This parameter is set to zero because it is redundant.

## Improved Compatibility

						95% CI		
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[ImprCom_Rec4 = .00]	-4.760	.699	46.383	1	.000	-6.130	-3.390
	[ImprCom_Rec4 = 1.00]	-2.318	.433	28.622	1	.000	-3.168	-1.469
	[ImprCom_Rec4 = 2.00]	.234	.406	.333	1	.564	-.561	1.029
Location	[Physician_Gender=.00]	-.120	.244	.241	1	.624	-.599	.359
	[Physician_Gender=1.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Physician_Age=.00]	.255	.522	.239	1	.625	-.768	1.279
	[Physician_Age=1.00]	.390	.383	1.037	1	.308	-.361	1.141
	[Physician_Age=2.00]	.069	.377	.034	1	.854	-.670	.808
	[Physician_Age=3.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Private_Mobile_Use=.00]	-.395	.220	3.228	1	.072	-.825	.036
[Private_Mobile_Use=1.00]	0 <sup>a</sup>	.	.	0	.	.	.	

Link function: Logit.

a. This parameter is set to zero because it is redundant.

## Training

						95% CI		
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[Training_Rec4 = .00]	-4.563	.561	66.176	1	.000	-5.662	-3.464
	[Training_Rec4 = 1.00]	-2.498	.435	32.982	1	.000	-3.350	-1.645
	[Training_Rec4 = 2.00]	.060	.405	.022	1	.882	-.735	.855
Location	[Physician_Gender=.00]	-.697	.248	7.896	1	.005	-1.184	-.211
	[Physician_Gender=1.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Physician_Age=.00]	-.703	.524	1.801	1	.180	-1.729	.324
	[Physician_Age=1.00]	-.357	.384	.865	1	.352	-1.111	.396
	[Physician_Age=2.00]	-.799	.381	4.384	1	.036	-1.546	-.051
	[Physician_Age=3.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Private_Mobile_Use=.00]	.132	.218	.368	1	.544	-.295	.560
[Private_Mobile_Use=1.00]	0 <sup>a</sup>	.	.	0	.	.	.	

Link function: Logit.

a. This parameter is set to zero because it is redundant.

### Increase in Demand

						95% CI		
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[InDem_Rec4 = .00]	-4.569	.582	61.583	1	.000	-5.710	-3.428
	[InDem_Rec4 = 1.00]	-2.995	.457	43.016	1	.000	-3.891	-2.100
	[InDem_Rec4 = 2.00]	.034	.412	.007	1	.933	-.774	.843
Location	[Physician_Gender=.00]	.309	.249	1.534	1	.215	-.180	.798
	[Physician_Gender=1.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Physician_Age=.00]	.069	.533	.017	1	.897	-.975	1.113
	[Physician_Age=1.00]	-.333	.391	.726	1	.394	-1.101	.434
	[Physician_Age=2.00]	-.308	.386	.637	1	.425	-1.064	.448
	[Physician_Age=3.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Private_Mobile_Use=.00]	-.642	.225	8.149	1	.004	-1.083	-.201
[Private_Mobile_Use=1.00]	0 <sup>a</sup>	.	.	0	.	.	.	

Link function: Logit.

a. This parameter is set to zero because it is redundant.

### Evidence

						95% CI		
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[Evid_Rec4 = .00]	-3.678	.447	67.555	1	.000	-4.555	-2.801
	[Evid_Rec4 = 1.00]	-2.000	.412	23.566	1	.000	-2.807	-1.192
	[Evid_Rec4 = 2.00]	-.176	.396	.197	1	.657	-.951	.600
Location	[Physician_Gender=.00]	-.248	.233	1.127	1	.288	-.705	.210
	[Physician_Gender=1.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Physician_Age=.00]	-1.544	.513	9.065	1	.003	-2.549	-.539
	[Physician_Age=1.00]	-1.365	.380	12.917	1	.000	-2.109	-.621
	[Physician_Age=2.00]	-1.175	.373	9.912	1	.002	-1.907	-.444
	[Physician_Age=3.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Private_Mobile_Use=.00]	-.046	.209	.049	1	.824	-.455	.362
[Private_Mobile_Use=1.00]	0 <sup>a</sup>	.	.	0	.	.	.	

Link function: Logit.

a. This parameter is set to zero because it is redundant.



## Reduction in Legal Concerns

		Estimate	Std. Error	Wald	df	Sig.	95% CI	
							Lower Bound	Upper Bound
Threshold	[RedLegCon_Rec4 = .00]	-3.136	.449	48.837	1	.000	-4.016	-2.257
	[RedLegCon_Rec4 = 1.00]	-1.613	.402	16.103	1	.000	-2.401	-.825
	[RedLegCon_Rec4 = 2.00]	.263	.391	.453	1	.501	-.503	1.029
Location	[Physician_Gender=.00]	-.355	.235	2.291	1	.130	-.815	.105
	[Physician_Gender=1.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Physician_Age=.00]	.016	.504	.001	1	.974	-.972	1.004
	[Physician_Age=1.00]	-.189	.368	.263	1	.608	-.911	.533
	[Physician_Age=2.00]	-.148	.363	.167	1	.683	-.860	.563
	[Physician_Age=3.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[Private_Mobile_Use=.00]	-.149	.210	.507	1	.476	-.561	.262
	[Private_Mobile_Use=1.00]	0 <sup>a</sup>	.	.	0	.	.	.

Link function: Logit.

a. This parameter is set to zero because it is redundant.

**APPENIX B**

**EXHIBITS**

**USERS: PHYSICIANS ALREADY EMPLOYING MOBILE TECHNOLOGIES  
(QUESTIONNAIRE B)**

## Exhibit XII

### Questionnaire B – Physicians Employing Mobile Technologies in their Medical Practice (German)

1. *Wie setzen Sie momentan mobile Technologien in der Kommunikation mit Ihren Patienten bereits ein – welche planen Sie in der Zukunft einzusetzen? (1 Setze bereits ein, 2 In der Zukunft geplant, 3 Nicht geplant)*

	1	2	3
In der Bereitstellung von Informationen im Wartezimmer der Praxis z.B. durch WIFI			
In der Vorbereitung von Patientengesprächen			
In der Unterstützung des Patientengesprächs während der Behandlung			
Um Patienten an ihre Medikamenteneinnahme oder Therapietreue zu erinnern			
Um Patienten die Kommunikation via SMS oder E-Mails zu ermöglichen			
Zur Durchführung von Patientenbefragungen			
Zur Gewinnung neuer Patienten			
Zur Unterstützung von praxisinternen Verwaltungsabläufen wie z.B. Terminvergabe, Dokumentation			
Zur Übersendung von aktuellen Informationen via SMS an Patienten			
Um eventuelle Zusatzleistungen (z.B. IGeL Leistungen) den Patienten anzubieten			
Um Image / Außendarstellung zu unterstützen			
Um generell die Kommunikation mit den Patienten zu verbessern			
Um die allgemeine Zufriedenheit der Patienten zu steigern			
Für den elektronischen Zahlungsverkehr z.B. Praxisgebühr oder Zusatzleistungen			
Weitere Einsatzgebiete (bitte angeben)			

2. *Welche Erfahrungen haben Sie persönlich bisher mit dem Einsatz mobiler Technologien in der Patientenkommunikation gemacht? ( ++ Stimme stark zu, + Stimme zu, - Stimme nicht zu, -- Stimme überhaupt nicht zu, x Frage trifft nicht zu / keine Angaben möglich)*

	++	+	-	--	x
Ich kann schneller medizinisch relevante Informationen vor dem Behandlungsgespräch zugreifen					
Die Durchführung von Patientengesprächen ist wesentlich leichter und einfacher					
Gezielte Patienteninformationen helfen das Behandlungsgespräch zu verkürzen					
Der schnelle Zugriff auf medizinisch aktuelle Informationen hilft bei der Diagnose					
Sind nützlich für die schnelle Suche nach geeigneten Präparaten					
Sind nützlich für die Dokumentation des Behandlungsgesprächs					
Ich erhalte mehr Feedback von meinen Patienten					
Es verbessert die Kommunikation mit den Patienten					
Patienten besuchen regelmäßig unsere Webseite					

Patienten rufen weniger an und benutzen häufiger E-Mail oder SMS					
Weniger Patientenfluktuation					
Die Wartezeiten für die Patienten werden verkürzt					
Interne Abläufe wie z.B. Terminvergabe, Patientendokumentation werden vereinfacht					
Höhere Zufriedenheit der Patienten					
Gewinnung neuer Patienten durch mobile Webseite oder Arztsuche					
Mehr Flexibilität in der allgemeinen Kommunikation mit den Patienten					
Der Einsatz mobiler Technologien ist hilfreich Zusatzleistungen (z.B. IGeL) anzubieten					
Durch den Einsatz mobiler Technologien entsteht ein Image bzw. Wettbewerbsvorteil					
Weitere Erfahrungen (bitte angeben)					

3. Altersgruppe des ausfüllenden Arztes:

- 31 – 40 Jahre       41 – 50 Jahre       51 – 60 Jahre       61 oder älter

4. Geschlecht des ausfüllenden Arztes:       männlich       weiblich

5. Nutzen Sie zum jetzigen Zeitpunkt mobile Technologien für private Zwecke?  
(z.B. zur Abfragung medizinischer Informationen im Internet via Ihres Handys oder zur Verwendung eines mobilen Apps)

- Ja       Nein

### Exhibit XIII

#### Questionnaire B – Physicians employing mobile technologies in their medical practice (English – Translated)

1. *How do you presently employ mobile technologies in the communication with your patients. How do you plan to employ them in the future. (1 Already using, 2 Planned for the future, 3 Not planned)*

	1	2	3
To provide information in the waiting room area of the practice (for example via WIFI)			
To prepare the patient encounter			
To support the communication with the patient during the encounter			
To send patient appointment or adherence reminders			
To permit patients to communicate via SMS with our practice			
To conduct patient surveys using a mobile device			
To obtain new patients through the listing in mobile physician search sites			
To support internal administrative tasks such as documentation or scheduling			
To send information via SMS to patients			
To offer additional services to patients			
To enhance the image of practice			
To enhance the communication with patients in general			
To increase patient satisfaction			
To enable mobile payments such as consultation or prescription fees			
Other (please specify)			

2. *What experiences have you personally made with the utilization of mobile technologies in the communication with your patients. (++ Strongly agree, + agree, - Disagree, -- Strongly disagree, x does not apply / no experience)*

	++	+	-	--	x
Faster access to medical information before the patient encounter					
Targeted patient information helps to reduce the time of the patient encounter					
Mobile technologies aid in diagnosing patients					
Faster search for adequate medications					
Mobile technology is useful for the documentation of patient encounter					
Patient provide more feedback					
Mobile technologies Improve the overall communication with the patients					
Existing patients call the practice less frequently					
Patient fluctuation has decreased					
Waiting-time for patients has been reduced					
Internal administrative processes such as patient scheduling and documentation have become easier					
The use of mobile technology leads to higher patient satisfaction					
Mobile technologies are useful for obtaining new patients through mobile physician search sites					
The use of the mobile medium makes the communication with patients more flexible					

Mobile technology is useful to offering additional services					
The use of mobile technologies benefits the image of our medical practice					
Other experiences (please specify)					

3. *Age group of participating physician:*

- 31 – 40 years                     
 41 – 50 years                     
 51 – 60 years  
 61 years or older

4. *Gender of participating physician :*                       Male                       Female

5. Do you presently use mobile technologies privately for professional purposes (for example to access medical information on the Internet using your mobile phone or using a mobile application

- Yes                       No

## Exhibit XIV

### Question 1: Current, Planned and Unplanned Use of Mobile Technology – Absolute and Relative Frequency Distribution

Activity	Current Use		Planned Use		Not Planned Use	
	Absolute	Valid %	Absolute	Valid %	Absolute	Valid%
Provide Information in Practice	32	32.2	16	16.2	51	51.5
Prepare Patient Encounter	29	29.3	20	20.2	50	50.5
Support Patient Encounter	25	25.8	17	17.5	55	56.7
Conduct Patient Surveys	18	18.2	28	28.3	53	53.5
Offer Additional Services	37	37.4	22	22.2	40	40.4
Facilitate Payments	11	11.6	64	67.6	20	21.1
Send Patient Reminders	24	24.2	24	24.2	51	51.5
Permit Communication via SMS	65	65.0	16	16.0	19	19.0
Send Information via SMS	25	25.3	28	28.3	46	46.5
Obtain New Patients	32	32.3	25	25.3	42	42.4
Administrative Support	68	68.7	24	24.2	7	7.1
Enhance Image	54	54.5	24	24.1	20	20.4
Enhance Communication	66	66.7	23	23.2	10	10.1
Increase Patient Satisfaction	62	62.6	20	20.2	17	17.2

## Exhibit XV

### Research Question #14: SPSS Variable Legend and Coding

<b>Variable / SPSS label</b>	<b>Item</b>	<b>SPSS coding</b>
Provide Information in Practice/ ProvInfo_Recode2	To provide information in the waiting room area of the practice (for example via WIFI)	0 – Not Planned 1 – Current and Planned
Prepare Patient Encounter/ PrepEnc_Recode2	For the preparation of the patient encounter	0 – Not Planned 1 – Current and Planned
Encounter Communication Support/ SupComEnc_Recode2	For the support of the communication with the patient during the encounter	0 – Not Planned 1 – Current and Planned
Patient Reminders/ PatRem_Recode2	To send remind patients to take their medicines or the follow their therapy (adherence) to their mobile phones	0 – Not Planned 1 – Current and Planned
Permit Patient Communication/ PermCom_Recode2	To permit patients to communicate via SMS	0 – Not Planned 1 – Current and Planned
Conduct Patient Surveys/ ConSur_Recode2	To conduct patient surveys	0 – Not Planned 1 – Current and Planned
Obtain New Patients/ ObtNewPat_Recode2	To obtain new patients	0 – Not Planned 1 – Current and Planned
Administrative Support/ IntAdSup_Recode2	To support internal administrative purposes such as appointment provision, documentation	0 – Not Planned 1 – Current and Planned
Send Information/ SendInfo_Recode2	To send relevant information such as newsletters via SMS to patients	0 – Not Planned 1 – Current and Planned
Offer Additional Services/ OfAdServ_Recode2	To offer additional services to patients	0 – Not Planned 1 – Current and Planned
Enhance Image/ Image_Recode2	To enhance image of our practice	0 – Not Planned 1 – Current and Planned
Enhance Communication/ EnhCom_Recode2	To enhance the communication with patients in general	0 – Not Planned 1 – Current and Planned
Increase Patient Satisfaction/ IncrSatis_Recode2	To increase general patient satisfaction	0 – Not Planned 1 – Current and Planned
Payment Support/ PaySup_Recode2	To support electronic payments such as consultation or prescription fees	0 – Not Planned 1 – Current and Planned
Gender/ Gender_Recode	Physician's gender	0 Male 1 Female
Age Group/ Age_Recode2Cat	Physician's age group	0 – 31-50 years 1 – over 50 years



## Exhibit XVI

### Question 2: Experiences Resulting from Use of Mobile Medium - Frequencies

	Description	Strongly Disagree %	Disagree %	Agree %	Strongly Agree %	No Experience %
Patient Encounter	I can faster access relevant medical information before the encounter	4.0	8.1	31.3	47.5	9.1
	The faster access to relevant medical information helps in diagnosing patients	5.1	15.3	34.7	35.7	9.2
	I can search more quickly for medications	7.1	22.2	30.3	28.3	12.1
	Useful for documentation of patient encounter	11.3	24.7	21.6	32.0	10.3
Patient Behavior	Patients give me more feedback	11.0	36.0	26.0	12.0	15.0
	Patients call less frequently	16.2	38.4	18.2	11.1	16.2
	Less patient fluctuation	20.6	38.1	13.4	6.2	21.6
Operational Efficiency	Internal processes such as patient scheduling have become easier	9.2	15.3	33.7	34.7	7.1
	Reduced waiting times for patients	24.5	39.8	12.2	10.2	13.3
	Targeted patient information helps to reduce the time of the patient encounter	8.3	13.5	34.4	36.5	7.3
General	More flexibility in the overall communication with the patients	7.1	15.2	42.4	29.3	6.1
	Improved overall communication with the patients	5.2	22.7	47.4	18.6	6.2
Marketing & Sales Support	Effective for obtaining new patients through mobile physician search sites	3.0	16.2	36.4	33.3	11.1
	Suitable for offering additional services	8.1	23.2	28.3	31.3	9.1
Image & Patient Satisfaction	Using Mobile technologies improves image	9.4	12.5	43.8	27.1	7.3
	Use of mobile technology leads to higher patient satisfaction	5.1	21.2	42.4	20.2	11.1

## Exhibit XVII

### Research Question #16 SPSS Variable Legend and Coding

<b>Variable / SPSS code</b>	<b>Description</b>	<b>SPSS Coding</b>
Access information before patient encounter/ AcclInfo_3	Faster access to medical information before the patient encounter	0 -Disagreement 1 -Agreement 99- No experience
Time reduction in patient encounter/ Red_Time_Recode3	Targeted patient information helps to reduce the time of the patient encounter	0 -Disagreement 1 -Agreement 99- No experience
Diagnose support/ Diag_Recode3	Mobile technologies support in diagnosing patients	0 -Disagreement 1 -Agreement 99- No experience
Medication prescription support/ SeMedi_Recode3	Faster search for adequate medications	0 -Disagreement 1 -Agreement 99- No experience
Documentation support/ Docu_Recode3	Mobile technology is useful for the documentation of patient encounter	0 -Disagreement 1 -Agreement 99- No experience
Feedback/ Feedb_Recode3	Patient provide more feedback	0 -Disagreement 1 -Agreement 99- No experience
Communication/ ImprCom_Recode3	Mobile technologies Improve the overall communication with the patients	0 -Disagreement 1 -Agreement 99- No experience
Reduction in patient calls/ RedCalls_Recode3	Existing patients call the practice less frequently	0 -Disagreement 1 -Agreement 99- No experience
Reduction in patient fluctuation/ RedFluc_Recode3	Patient fluctuation has decreased	0 -Disagreement 1 -Agreement 99- No experience
Reduction in waiting-times / RedWait_Recode3	Waiting-time for patients has been reduced	0 -Disagreement 1 -Agreement 99- No experience
Internal process support/ IntProc_Recode3	Internal administrative processes such as patient scheduling and documentation have become easier	0 -Disagreement 1 -Agreement 99- No experience
Increase in patient satisfaction/ PatSatis_Recode3	The use of mobile technology leads to higher patient satisfaction	0 -Disagreement 1 -Agreement 99- No experience
Obtaining new patients/ ObtainNewPat_Recode3	Mobile technologies are useful for obtaining new patients through mobile physician search sites	0 -Disagreement 1 -Agreement 99- No experience
More flexible communication / MprCom_Recode3	The use of the mobile medium makes the communication with patients more flexible	0 -Disagreement 1 -Agreement 99- No experience
Offering additional services/ OMewServ_Recode3	Mobile technology is useful to offering additional services	0 -Disagreement 1 -Agreement 99- No experience
Inhances image / ComAd_Recode3	The use of mobile technologies benefits the image of our medical practice	0 -Disagreement 1 -Agreement 99- No experience

### Exhibit XVIII

#### Research Question #16: Logistics Regression Variables in the Equation and Model Summary

Variables in the Equation		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
	OfAdServ_2(1)	-1.085	.588	3.409	1	.065	.338	.107	1.069
Step	PermCom_2(1)	-1.248	.551	5.136	1	.023	.287	.098	.845
1 <sup>a</sup>	SendInfo_2(1)	-2.347	1.085	4.679	1	.031	.096	.011	.802
	Constant	4.008	1.143	12.289	1	.000	55.022		

a. Variable(s) entered on step 1: OfAdServ\_2, PermCom\_2, SendInfo\_2.

#### Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	82.803 <sup>a</sup>	.231	.327

**APPENIX C**  
**PUBLICATION**

# Mobile Marketing: Applications And Implications For Physicians In Private Practice

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## ABSTRACT

*The rapid proliferation of mobile technologies and mobile devices has resulted in an increase in the importance of mobile marketing and has captured the interest of academic researchers from a wide variety of disciplines. Due to its unique characteristics, mobile marketing is playing an increasingly significant role in marketing communication and Customer Relationship Management (CRM) efforts of organizations in various industries and professions. As mobile technologies and applications continue to evolve, the resulting opportunities for their increased use in the health care sector at large, and within specific sectors in the industry, are poised to increase significantly in coming years. Specifically, this paper explores the primary applications and implications of mobile marketing for physicians in private practice. Some of the key questions and challenges associated with the integration of mobile technologies by physicians in private practice are investigated and suggestions are made for future research directions.*

**Keywords:** Mobile Marketing; Mobile Marketing Communications; mCRM; Physician-Patient Communication

## INTRODUCTION

The rapid proliferation of mobile technologies and devices presents marketers of all industries and geographic regions with new and, in many cases, unique possibilities to reach out to their existing and potential customers. The advent of digital media has dramatically changed the way in which consumers interact with companies, the media, and each other (Winer, 2009). Mobile communication technologies have penetrated markets throughout the world, and thus mobile marketing is likely to have a strong influence on future business activities, consumer behavior, as well as on national and global markets (Dai & Palvia, 2009). Mobile marketing has been defined as “the use of wireless media as an integrated content delivery and direct response vehicle within a cross-media or stand-alone marketing communications program” (Mobile Marketing Association, 2008). Mobile marketing is changing the way organizations communicate with their chosen target groups. While the use of mobile marketing channels has given rise to completely new forms of marketing, it also affects traditional media by making them interactive (Sharma, Herzog, & Melfi, 2008, p. 107). The main goal of this paper is to explore the primary uses for mobile technologies and devices as a marketing communication tool for physicians in private practice.

A wide variety of companies such as airlines, banks, consumer products and pharmaceutical companies are increasingly capitalizing on the opportunities presented by mobile technologies and devices. As a result, mobile marketing expenditure is estimated to reach \$20.0 billion by 2015 (Gartner, 2011). Academic research on mobile marketing and its related subtopics is still considered nascent and scattered across disciplines (Shankar & Balasubramanian, 2009). A number of literature reviews have been published to summarize and conceptualize research findings in the field and to identify future research opportunities (e.g. Drossos & Giaglis, 2010; Shankar & Balasubramanian, 2009; Varnali & Toker, 2010). The use

of mobile devices and technologies is finding increasing applications in different industries and has prompted industry-specific research such as in retail (Shankar, Venkatesh, Hofacker & Naik, 2010), banking (Riivari, J., 2005; Cruz, Filgueiras Neto, Muñoz-Gallego & Laukkanen, 2010), hospitality (Wang & Wang, 2010), education (Scornavaca, Huff & Marshall, 2009), or the pharmaceutical industry (BenMousa, 2010). However, for many companies, mobile marketing still represents a mysterious and challenging new component of a company's communication mix (Pousttchi & Wiedemann, 2010). Many aspects of academic findings in this field are valid for a wide variety of industries and type of marketers, while other aspects are unique to specific sectors thus deserving specialized attention.

West and Blankenship (1975) noted more than three decades ago, that marketing concepts and physicians' professionalism are not incompatible in the pursuit of the patients' best interest. Van Doren and Blank (1992) claim that physicians are just as vulnerable to the laws of competition as any professional and thus those who learn to use the principles of marketing in a way that enhances health care will be the ones that benefit the most. Professional management and marketing in a changing health care environment is also perceived to offer physicians the opportunity to enhance the trust of their patients and build long-term relationships with them while maintaining a high quality of service (Letter, 2005). Whereas marketing should not be equated with promotion, it can contribute to the economic viability of a physician's practice, thus being the very pre-requisite to fulfill the physician's oath (Gehring & Gehring, 2005). But is mobile marketing feasible for physicians in private practice?

This paper explores the primary uses for mobile technologies and devices as a marketing communication tool for physicians in private practice. It also reviews some of the key questions and challenges associated with the use of mobile marketing channels in the physician-patient communication and makes suggestions for future research work. In this study, mobile marketing is considered an emerging field of marketing communications consisting of advertising, sales promotion, direct marketing and customer relationship management as proposed by Leppäniemi and Karjaluoto (2008).

## **MACRO DRIVERS**

The topic of mobile marketing in a private practice physician's context can be considered in the context of three macro drivers: the rise of mobile technology in the healthcare sector, the changing physician- patient relationship, and rising adoption rates of mobile devices and services by both physicians and their patients.

### **Macro Driver #1: The rise of mobile technology in the healthcare sector**

The emergence of mobile technologies and devices has given rise to the wider topic of mobile health (m-health), which has been defined as the "emerging mobile communications and network technologies for healthcare" (Istepanian & Lacal, 2003) or the medical and public health practice supported by mobile devices, such as mobile phones, patient monitoring devices, personal digital assistants (PDAs), and other wireless devices (World Health Organization, 2011). Mobile technologies and devices have been perceived to offer new possibilities and to possess the potential to address many of the healthcare challenges and demands of the twenty-first century (Goldberg & Wickramasinghe, 2003) and to become an integral part of healthcare practice, management and processes (Han, Mustonen, Seppänen, & Kallio, 2006). Wireless, handheld devices and systems have already started to change the ways of medical practice (Jokela et al., 2009). Mobile technologies are finding applications in both the administrative and the treatment side of healthcare. The penetration of mobile technologies in the health care arena is bound to gain momentum, and as a consequence more physicians will come into contact with that medium; it seems plausible to expect that this development would serve as an impetus for physicians to consider including such technologies into their communication mix with current or future patients.

## **Macro Driver #2: The changing physician-patient relationship**

In the advent of the information revolution, the expectations of patients are changing. Changes in information technology, first the Internet and now the mobile medium, are strongly impacting the way physicians interact and communicate with patients, and patients with physicians (Johnson & Ramaprasad, 2000). Patients increasingly expect to receive more information from their physicians and at the same time to be able to participate in the communication process. The traditional one-way communication from physician to patient is thus evolving from a monologue to a dialogue. The paternalistic, power-dependency model of the physician–patient encounter is changing, particularly by the Internet-driven information revolution (Laing, Hogg, & Winkelman, 2004). This change in the physician–patient relationship may entail changes in the amount and type of information flow and in the level of reciprocity in the relationship (Camacho, Landsman, & Stremersch, 2010). It may also entail a change in the communication channels used by physicians. A recent study conducted by medTera found that a large majority of patients felt that there was a lack of information and communication between them and their physicians (Comer, 2010) thus echoing similar claims by other authors (e.g. Epstein, Mauksch, Carroll, & Jaén, 2008). Patients are increasingly looking for and finding relevant medical information on the Internet (Cooley, 2009). Manhattan Research (2010) reports that in the U.S. alone, 99 million adults were found to be “e-empowered” consumers, having either challenged their physician’s treatment or diagnosis, asked their physician to change their treatment, discussed information found online at a doctor’s appointment, used the Internet instead of going to the doctor, or made a healthcare decision for themselves. The Internet is now the top source of health information for adults in the U.S., outranking their own physicians (Capgemini Consulting, 2011). The access to this information is also facilitated by the rapidly rising use of smart phones that more and more consumers use to go online. In order to heed the demands of “empowered” patients, physicians in private practice might be motivated to increasingly employ the mobile marketing channel into their communication mix.

At the same time, patients are increasingly voicing their opinion about their physicians on rating portals such as HealthGrades.com in the U.S. or Weisse-liste.de in Germany, on patient web communities, or on social media platforms. Consequently, due to the ubiquitous presence of digital media, patients increasingly have the power to significantly affect their physician’s image and reputation. In the case of Weisse-liste.de, 37 million insured patients of three major health insurers can rate their physicians along the dimension of “practice and personnel”, “physician communication”, “treatment” and “general impression” (Gras, 2011). Even though the impact of these rating portals has not been thoroughly analyzed, they constitute a potential explanation to why patient satisfaction is becoming increasingly important to physicians. Just as consumers have become “transparent” due to the availability of purchasing and other data, physicians are equally becoming “transparent” due to the increasing availability of information about their practice and the perceived quality of their services. It would seem reasonable that more transparency requires physicians to better manage their reputation than in the pre-digital and pre-mobile era and mobile technology could contribute to this endeavor.

## **Macro Driver #3: Adoption of mobile devices and services**

Physicians have turned into avid adopters of mobile technologies for private and professional purposes. According to recent U.S. market research data (Physicians Interactive, 2010), two-thirds of physicians are now using a mobile device for professional purposes and 70% of these users indicate that their mobile device is essential to their practice. Physicians’ adoption rates of tablet computers, most prominently the iPad, are soaring as well in Europe with 26 % of practicing physicians in Germany, France, Spain and Italy and the UK owning such a device (Tyer, 2012). Physicians use their mobile devices to look up information, browse articles, and to watch videos. In terms of mobile applications physicians make use of medical reference tools, drug information repositories, anatomical maps, medical dictionaries, disease treatments guides to diagnostic lab tools (Jackson & Coker Research Associates, 2011). Mobile consumption of medical news is increasing rapidly. However, there are significant differences in mobile consumption of medical news between various medical specialties (Healthcare IT News, 2011).

Consumers, and thus current and potential patients, are equally embracing mobile devices enthusiastically. The International Telecommunications Union, (2011) estimates that the global penetration rate of mobile phones has reached 87% in the developed world and 79% in the developing world, with 45% of the world's population covered by a 3G mobile network which is required for fast mobile Internet access. In the U.S. and Western Europe, 90% of mobile subscribers own a mobile phone that can access the mobile web (comScore, 2011). It is estimated that by 2015, approximately 500 million people worldwide will be using mobile health applications via smart phones – out of a total audience of 1.4 billion smart phone owners at that point (Murphy, 2010).

## **MOBILE MARKETING COMMUNICATIONS AND PHYSICIANS IN PRIVATE PRACTICE**

Private practice physicians can, and often already do, pursue a number of marketing communication objectives, using a variety of mobile tools and devices that entail different levels of technological and practical complexity. The decision to employ mobile technologies in the communication with current or potential patients is likely to be influenced by a host of different factors on a micro level that should be considered.

### **Inhibitors and Motivators**

For private physicians to employ the mobile channel as a marketing communication channel, inhibitors and motivators stemming from individual level perceptions regarding marketing, mobile technology, economic and legal considerations are likely to play a key role.

In general, physicians' acceptance and use of a variety of new technologies including mobile devices has been the subject of a significant amount of academic research (e.g. Hu, Chau, Liu Sheng & Yan Tam, 1999; Chau & Hu, 2002; Chismar & Wiley-Patton, 2003; Dixon & Stewart, 2000; Han, 2005; Han et al., 2006; Park & Chen, 2007). The Technology Acceptance Model (TAM) is the most widely applied model for user acceptance and usage including the research conducted on physicians (Vatanparast, 2010). In this particular model "perceived usefulness" and "ease-of-use" form a user's attitude towards technology and leads to the intention to use a technology. The general consent of the insights produced by research conducted seems to be that the perceived usefulness of new technologies is one of the key influencing drivers contributing to the adoption and use of new technologies by physicians. Rogers (2003) states that one of the key factors for adoption of an innovation is the innovation's fit with the adopter's values (referred to as Compatibility). These factors may be compatible with the four sets of physician values identified by Kohli & Kettinger (2004) that include economic values, status values (motivation to be competitive vis-à-vis competitors), altruistic values (desire to put patient's best interest first) and legalistic values (concern of legal consequences). Research of Burley, Scheepers and Fisher (2005) for example seems to indicate that the main adoption decision to buy and use PDAs is made by individual healthcare professionals on a voluntary basis (optional innovation-decision).

However, whereas the above-listed research is relevant and thus applicable to physician's adoption of new technology in general, or mobile technologies and devices in particular, and provides useful insights, the approach of this study is that the decision of a physician in private practice to include the mobile channel into his or her marketing communication will most likely be influenced by a host of additional drivers that need to be explored.

The adoption of a mobile device by a physician for personal or professional use should not be equated with the adoption of the same technology for marketing communication purposes towards current and potential patients. In other words, whereas existing research seems to indicate that physicians as a professional group are avid users of mobile technologies, at the present stage, the mobile channel is just being discovered, albeit slowly, as a marketing or customer relationship channel by this particular group.



## **Practical considerations**

Physicians in private practice are not expert marketers, and are not expected to be so. As they do not count on a marketing department that could be responsible for conducting mobile marketing activities on an on-going basis, physicians in private practice face the same dilemma as small family-owned companies or start-up companies with limited marketing competences and resources. Physicians work in high stress data intensive environments (SpyGlass Consulting, 2005), usually involving a very large number of patient contacts per week (e.g. Von Borstel, 2010). Hu et al. (1999) suggested that many physicians have little interest in learning about a new technology, even if it is easy to use due to time constraints. In general, the use of the mobile channel as a marketing communication tool has been found to be hindered by the lack of specific competences, the lack of standardization of marketing and mobile technology (Valsecchi, Renga, & Rangone, 2007) or stemming from limitations of mobile devices themselves including the small screen size and the lack of a standard mobile platform (J.P Morgan, 2010). The lack of a standardized mobile platform for instance refers to the multitude of mobile phone models with different physical and functional designs, screen sizes on the one hand, and technological differences in terms of supported technologies, browser types and operating systems on the other (Gartner, 2011). The degree, to which these obstacles need to be overcome however, will depend on the type of mobile marketing communication used.

SMS messages for instance do not require an adaptation to a specific operating system, whereas a mobile practice app does. Hence, the level of complexity of mobile marketing communication varies significantly depending on the scope, objectives and tools to be used. As emphasized by Sinisalo, Salo, Karjaluoto & Leppäniemi (2007), mobile marketers, in this case private practice physicians, must assess their marketing communication capabilities, which include human, technological, and financial resources among others, to ensure that they have the requisite resources to effectively execute the activities related to each of the communications tools and channel. These capabilities will be distributed differently among private practice physicians and will thus contribute to the decision if the mobile channel represents a viable option to communicate with existing and potential patients. As physicians have been found to keep many non-physician clinical tasks to themselves, in order to manage their risk as small business owners (Ludwick & Doucette, 2009), it is conceivable that these implementation issues are likely to hinge on the capabilities present within a physician's practice, thus limiting the range of mobile marketing activities.

In addition, the decision to use mobile technologies and devices for marketing communication purposes could be influenced by the characteristics of the type of patients seen by the physician. These characteristics include demographics, socio-economic factors, health insurance coverage, information needs, and perceptions of mobile marketing among others and tend to differ significantly between different physician groups.

## **Economic considerations**

As physicians in private practice can be perceived to be entrepreneurs managing their own business, economic considerations will play a role in the decision to include mobile marketing communication. In general, a user's perceived return on investment of acquiring new technology and the compatibility of the technology or medium influences the adoption thereof (Rogers, 2003). Specifically, the use of the mobile channel as a marketing communication tool is hindered by the uncertainty of return on investment (Valsecchi et al., 2007). The cost, real or perceived, would include the cost of purchasing the necessary mobile devices or technology, maintenance and personnel or administrative cost. In terms of adoption of electronic health records (EHR) for example, DesRoches et al. (2008) found that financial barriers were viewed as having the greatest effect on decisions about the adoption thereof. However, Friedrich, Gröne, Hölbling & Peterson (2009) claim that mobile marketing is becoming economically feasible as costs are diminishing. In fact, using mobile technology and devices in their patient-directed communication might be as low as the cost of acquiring an iPad for example.

## **Individual characteristics and perceptions**

Technology adoption and perception have been correlated with age with younger physicians appearing to be more prone to adopt new mobile technologies for private or professional use (e.g. Bramble et al., 2010; Menachemi, Powers & Brooks, 2011). As one generation of physicians in private practice retires and a new generation follows, it is conceivable that the overall adoption of mobile technology is poised to increase.

Marketing is still misunderstood, resisted or ignored by many physicians while at the same time physicians have been found to be ill-equipped to deal with changing expectations of their patients (Weinrauch, 1982). At the same time, many physicians feel that they are doing things that they should not be doing (Moores, Wilson, Cave, Woodhead Lyons & Donoff, 2007). Results of a recent study conducted with physicians in Germany, found that approximately 50% of physicians rated marketing activities as either very important (16.9%) or important (33.1%) and approximately one fifth were of the opinion that today's patients expect some forms of marketing from their practice (Stiftung Gesundheit, 2011).

## **Legal and privacy issues**

Physicians as a professional group are also severely limited in terms of permissible marketing activities towards their existing or potential patients, facing a plethora of laws and professional limitations regarding marketing and marketing communication activities. In the U.S., state medical boards establish permissible medical marketing statements by physicians, with restrictions varying from state to state. For example, some states entirely forbid the use of patient testimonials (Etna Interactive, n.d.). In the case of Germany for instance, physicians' marketing activities as a professional group are governed by a number of laws and regulations including the Act Against Unfair Competition (UWG), the German Medical Products Advertising Act (HWG), and the German Telemedia ACT (TMG) – all of which are summarized in the Professional Code for Physicians (Musterberufsordnung fuer Aerzte - MBO) by the German Medical associations which regulates the ethical and professional obligations of physicians among themselves and vis-à-vis patients. For information provided via the Internet alone, the remote services statutes (Teledienstgesetz (TDG) and the Teleservices Data Protection Act (Teledienstschutzgesetz) – (Brandt, 2005; Kassenärztliche Bundesvereinigung, 2010). Not surprisingly, uncertainty about what marketing activities are permissible has been shown to be high among physicians in Germany (Stiftung Gesundheit, 2011). Also, security concerns and lack of support have been found to be among the factors limiting the adoption of hand-held computers in healthcare (e.g. Lu, Xiao, Sears & Jacko, 2005).

## **Health care system characteristics**

Incentives provided by the health care system in which a physician works are also likely to have an effect of the adoption of mobile technologies. Different health care systems provide different incentives to see more patients and determine the overall economic value that can be achieved by private physicians. These systems in return are strongly influenced by government action in terms of policies, regulations or initiatives related to the adoption of technology, as evidenced in the U.S. in the context of Electronic Health Records (EHRs). Also, within a European context, significant differences exist as discussed for example by Simonet (2010). It is hypothesized that the use of mobile marketing communications by physicians will be different in different health care systems.

## **Future potential facilitators**

A number of additional facilitators could possibly contribute to a physician's decision to adopt the mobile marketing channel. These incentives, however still theoretical in nature, could include financial incentives from health insurers or the government, practical support in the installation and maintenance of mobile systems, training or information sessions among others. The driving forces for these facilitating measures could come from the public sector, health insurers, or the private sectors such as software developers or hardware suppliers. How physicians evaluate these future potential facilitators remains to be investigated.

## **Mobile marketing objectives for physicians in private practice**

A number of classifications of mobile marketing objectives have been established by academic researchers including Leppäniemi and Karjaluoto (2008), Steimel, Paulke and Klemann (2008) and Pousttchi and Wiedemann (2010). In a physician-patient marketing communication context, possible objectives can be conceived to fall into two broad categories: patient-centered and practice-centered objectives.

### *Patient-centered objectives*

For communication purposes physicians may distinguish between communication towards current and potential patients. Consequently, patient-centered mobile marketing objectives could be further divided into mobile Customer Relationship Management (mCRM) and mobile advertising and promotion. Mobile CRM can be defined as customer relationship management of any kind including interactive communication between an organization and a customer using a mobile device (Liljander, Polsa & Forsberg, 2007; Hsu & Lin, 2008). Directed towards existing patients, mCRM objectives could include relationship building, image building or up-selling. Up-selling in this context could, for instance, refer to offering patients additional services which require an extra payment. CRM activities by physicians make sense as satisfied patients return and may possibly ask for additional services or bring in new patients (Huber, 2010). As customers increasingly expect to be in a position to interact with organizations using different communication channels, Sinisalo et al. (2007) argue that organizations should integrate the mobile channel into their overall customer relationship program while taking advantage of the unique characteristics the medium provides. At the same time, the eventual success of any mobile CRM effort is closely linked with customers' readiness to use existing mobile service (Liljander et al., 2007) and the option of consumer opt-in (e.g. Barnes & Scornavacca, 2004; Bauer, Reichardt, Barnes & Neumann, 2005; Leppäniemi & Karjaluoto, 2005).

Mobile advertising and promotional activities are directed towards potential patients with the objective to attract potential patients to a physician's practice, distinguishing themselves from competitors. Activities include listings in mobile search pages, physicians' directories, and mobile practice apps or websites. However, as noted above, these activities are usually heavily regulated or restricted by legislation and thus should be examined on a per-country basis.

### *Practice-centered objectives*

Practice-centered objectives relate to the increase in operational efficiency that has been linked to the inclusion of mobile technologies into the workflow of medical practices. The use of mobile technologies has been suggested to enhance operational efficiency through changing data access patterns (Liang, Huang, Yeh, & Lin, 2007). This higher operational efficiency could for instance materialize by having fewer patients missing their appointments, making their appointments electronically instead of on the phone, or by making the patient encounter more efficient.

As evidence about the actual effect of the inclusion of mobile technology is rare, we suspect that expectations about potential operational efficiency gains will contribute to a physician's decision to include the mobile channel in the communication with current or potential patients. A word of caution in this context, however, comes from Kassirer (2000) who found that electronic patient-physician communication gives rise to new challenges for physicians, including the inability on the providers' part to manage large message volumes. This factor could be especially important for possible mobile one-on-one marketing communication.

## **Mobile Tools and Channels for physicians in private practice**

For a physician a number of plausible mobile tools exist for the communication with existing and potential patients. These different mobile tools and solutions are characterized by various degrees of technological and administrative complexity. These tools range from simply

using a mobile tablet PC, such as Apple's iPad, as a communication support tool during a consultation with a patient, to maintaining a mobile optimized practice webpage or providing a mobile practice app with a variety of functions to potential and existing patients. An overview of feasible and realistic mobile tools is presented in table 1.

**Table 1: Mobile tools and channels for physician's mobile marketing**

<b>Mobile Customer Relationship Management (mCRM)</b>		
<b>Activity / Category</b>	<b>Mobile Channel</b>	<b>Description</b>
Additional Patient Services	Mobile practice app	Downloadable practice app provides general information including practice hours, service overview, physician information as well as complementary tools such as map tool, direct call and email options.
Appointment (re)-scheduling	Mobile web, mobile practice app	Patients can (re)-schedule appointments via physician's mobile web or by using mobile practice application.
Appointment reminders	SMS, mobile practice app	Patients receive a SMS message to their mobile phones or receive a notification by the mobile practice app to remind them of upcoming appointment.
General information provision/ patient education	Mobile web, narrowcasting	Patients can access general information on premise using internet –enabled mobile device on local area network or narrowcast for example in waiting room area of practice.
In-consultation communication support	Mobile web, mobile apps	Physician employs mobile device such as a mobile tablet device to look up information using the mobile web, a mobile app, sharing information with the patient in written or graphical form.
Medication adherence reminders or alerts	SMS, mobile app	Patients receive personalized reminder or alert via SMS, email message or alert on mobile practice app. ns with other medication the patient might be taking. Also suited for medication recall notices from the manufacturer.
Other Services	SMS	Patients receive personalized message for birthdays or other personal events.
Mobile community	Mobile web page	Patients interact with each other, posting comments or questions to other patients on mobile physician or practice web page or social media site.
Mobile feedback channel	SMS, mobile web, mobile practice app	Patients send SMS or emails via mobile devices to physician's offices or post comments or questions on their physician's patient portal.
Mobile newsletters, blogs	SMS, mobile web, mobile physician or patient portal or via	Patients receive physician or practice newsletters, blog updates or other news in entirety or as link.
Mobile Payment Options	Mobile payment systems	Patients can make co-payments or payments for costs not covered by health insurance in physician's office using their mobile phones.
Other alerts and reminders	SMS, email through mobile web	Patients receive message on their mobile devices, reminding them on updating necessary vaccinations, periodical routine check-ups, allergy alerts etc.
Patient satisfaction surveys	Mobile web, On-site via mobile tablet computer (ex. iPad). Off-site via mobile physician or patient portal or via email via mobile web	Patients participate in patient satisfaction or other surveys using a mobile tablet computer provided by the physician or staff in the practice, access online surveys via their mobile phones while waiting in physician practice or from any other location.
Post-consultation support	Mobile physician web portal, patient portal, mobile app, SMS	Physician uses mobile device for documentation. Patients access online information provided by physicians on mobile webpage, physician or patient portal, or using physician recommended mobile apps on their mobile device.
Pre-consultation support	Mobile apps, access to patient data via mobile device, mobile administrative solutions	Physician uses mobile device, mobile app or mobile administrative software to review patient data before the consultation.

Mobile Advertising and Promotion		
Mobile advertising	Mobile web, Mobile practice app, QR code	Physician uses mobile advertising formats (e.g. banner ads) to advertise practice or services in relevant mobile web pages, ideally providing link to physician or practice webpage. Application of QR code on physician's practice sign or on other communication material.
Mobile search	Mobile (physician) search pages, directories	Physician lists practice and service information on specific mobile physician search portals.
Viral marketing	SMS, mobile web	Physician sends out information to existing patients in form of newsletters or blogs, via SMS for example, that may be passed on to via a mobile device.

## CONCLUSIONS AND FUTURE RESEARCH AVENUES

As Grant (2008) states, we are at the threshold of a mobile revolution that has the potential to revolutionize society. As mobile technologies present marketers of all specializations with new and in many ways, unique possibilities to communicate with their chosen target audience, there is no doubt that they will impact profoundly the way physicians communicate with existing and potential patients in the future. However, if mobile marketing as a research topic has been considered to be still in its infancy (Varnali & Toker, 2010), then we could argue that mobile marketing for physicians as a research topic is still in its embryonic stage.

As discussed in this paper, the emergence of the mobile channel for marketing purposes provides for a number of opportunities for marketers in general and for physicians in private practice in particular. Although existing research on the general topic of mobile marketing has made significant inroads on shedding light to the general understanding of the issues related to mobile marketing, a number of research questions in the above-discussed context remain to be investigated. Specifically, the following research questions would assist in furthering the academic and practical knowledge in this context. What are the factors that contribute to a physician's decision to employ mobile technology in their communication towards existing and potential patients? Likewise, what are the factors that represent detriments to the actual implementation and use of the mobile channel in the communication process of physicians with existing and potential patients? Given the premise that the use of mobile technologies in the physician-patient communication could be mutually beneficial situation, what are the factors that would make physicians adopt mobile technologies for this purpose? What are the "enabling" factors in this context? In which practical areas do physicians perceive the greatest future potential for mobile technologies? In other words, where does the future for mobile technologies and applications lie in the physician-patient context? What are the experiences with mobile technologies for said purpose by the "pioneers" – those physicians who already use it in their practice and thus what are the strengths and weaknesses of mobile technology from the perspective of physicians?

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