1 INTRODUCTION

The following sections introduce this book and the underlying research problem. First the introduction gives an overview about the mobile communication industry, then, the research questions and aim of the book follow. The second sub-chapter presents the implications and the research design is illustrated. The introduction closes presenting the structure.

The introduction of mobile devices – mobile phones, Personal Digital Assistants (PDAs), handhelds, etc. – and shift from voice to data transfer has changed the telecommunication industry. The business potential is immense, with Siemens estimating that European earnings for mobile communication industries will triple by 2010 from 1999 (Hartmann and Büppelmann, 2001, 2). Furthermore, using mobile devices for commerce, m-commerce, extends existing e-commerce applications by overcoming limitations of time and place (Müller-Veerse, 1999, 20f). Based on the mentioned unique characteristics, Kleijnen and colleagues (Kleijnen, Ruyter et al., 2002) define m-commerce as:

"Any electronic transaction of information interaction conducted using a mobile device and mobile networks (wireless or switched public network) thereby guaranteeing customers virtual and physical mobility; leading to the transfer of real or perceived value in exchange for personalized, location-based information, services or goods".

There are other definitions for m-commerce, some focusing only on the wireless aspect. Sadeh (2002, 5) for instance defines m-commerce as "the emerging set of applications and services people can access form their Internet-enabled mobile devices."

Balasubramanian et al. (2002, 349) do not just introduce a definition but try to conceptualize the phenomenon of m-commerce. According to them "it involves communication, either one-way or interactive between two or more humans, between a human (or humans) and one or more inanimate objects (such as databases), or between two of more inanimate objects (e.g., between devices).

At least one of the parties engaged in the communication must be mobile, in the sense that his, her or its ability to communicate is not contingent on being at a fixed physical location at a particular point in time.

The ability to communicate must possess the potential to be continuously maintained for at least one of the parties during a substantial physical movement from one location to another."
The communication signals between parties must be primarily carried by electromagnetic waves, without direct sensory perception of the signals.

If humans are communicating, at least one seeks to benefit economically from the communication, either in the short or the long run. If the communication is entirely between inanimate objects, such communication must be ultimately aimed at creating economic benefits for a human or a firm.”

For this book the understanding of m-commerce goes beyond acknowledging that a device is wireless, thus, the conceptualization of Balasubramanian et al. (2002) is a good starting point. The users, at the heart of this book, are now explored in more detail.

European end-users have a strong demand for mobile data services, are willing to use services like Multimedia Messaging Service (MMS), advanced location-based services or wireless offices with a mobile device (Hartmann and Büppelmann, 2001) and willing to spend additional money for these services. Consumers are predicted to increase expenses on their current mobile services by 69% and business users by 42% (Hartmann and Büppelmann, 2001, 3). As e-commerce has not reached the explosive growth figures predicted in the mid 1990s, the eyes of scholars and industry representatives are now set on the opportunities offered by wireless media. They envisage that the next phase of e-business growth will take place in mobile commerce (Varshney and Vetter, 2001). While some authors predict skyrocketing developments in m-commerce, others share a more cautious perspective, which is natural when a new technology emerges (Schuster, 2001).

Mobile data transfer remains low; voice usage still represents 90% of revenues for mobile net operators (NetValue, 2002, 4). Short Message Service (SMS) is the most popular form of data transfer with more than 10 billion messages sent world-wide each month (Cohn, 2001).

A comparison of slow adoption of WAP in Europe with the impressive adoption of i-mode services in Japan and the simple SMS based services in Scandinavia suggest that aggregate and technology based models are insufficient to explain the process of mobile services adoption and use (Pedersen, Leif et al., 2002). The adoption decisions of individual end-users must be better understood to predict and explain the use of mobile services.

There is a lack of adequate service quality delivered via mobile devices. If wireless channels are to be accepted by consumers, companies must shift the focus of m-business/m-commerce to m-service, all cues and encounters that occur before, during and after the transac-
tions. To deliver superior services companies must understand how consumers perceive and evaluate their mobile services.

The aim of this research is to develop and test a model that explains mobile services usage behavior. The mobile medium offers various ways of communication between companies and end users and there are some critical factors to keep in mind for the successful use of this medium. The following chapters introduce to the research questions and theoretical implications, the practical implications, the research design and the structure of the book.

1.1 Research Questions and Aims

Still in an experimental phase, little research exists and businesses have little experience with mobile media offering direct communication with consumers, anytime and anyplace. One of the key characteristics is the two way information flow of mobile messages between sender and receiver. This interactivity suggests drawing upon theories in marketing, consumer behavior, psychology and diffusion to investigate business and personal adoption of mobile services (Balasubramanian, Peterson et al., 2002; Barwise, Elberse et al., 2002; Barwise and Strong, 2002; Damanpour, 1991; Davis, 1989; Hoffman and Novak, 1996; Jee and Lee, 2002; Loch, Straub et al., 2003; Newell and Lemon, 2001; Rodgers and Thorson, 2000; Zmud and Apple, 1992).

Consumer behavior regarding mobile services has not yet been subject of much research in Europe but industry analysts have high expectations regarding the willingness to adopt mobile services.

Balasubramanian et al. (2002) introduce a taxonomy of mobile marketing usage and raise consumer-oriented, marketer-oriented and public policy-oriented research questions. Barwise and Strong (2002) reflect on the right execution of mobile advertising and conclude highlighting a void in research in the field of acceptance of services.

Concepts and guidelines for developing mobile services are generally missing. The Wireless World Research Forum (WWRF) presented their "Book of Visions" on the future of wireless networks stating:

"It will become more and more important how the users perceive the service and the emotional impact and pleasure that the service creates and maintains.” (WWRF, 2000)

There is little discussion on perceptions, emotions and pleasures created at the service and end-user level. Often vision papers elaborate technological requirements without discussion of the important end-user issues.

Thus, the central contribution of this research is the development of a model explaining customer perception of the service quality of mobile services and the resulting behavioral consequences. The analysis sheds
light on the views and perceptions of customers receiving mobile services. This book describes the development, refinement, psychometric evaluation, properties, and potential applications of a mobile service assessment and behavior model. The aims of the research are to answer the following questions:

- What are the antecedents of mobile service quality?
- How do consumers differ in their perceptions and behavior with regard to mobile services?
- Can the proposed model explain mobile consumer behavior?
- What are the behavioral consequences of perceived quality in a mobile services setting?
- The research questions can be split in four part-aims for a more formal perspective. The aim can be content, methodology, practical, and scientifically oriented including answers of research questions in the following areas.

**Research Aims Concerning the Content**
- Analysis of the topic “Mobile Service Quality and Behavioral Outcomes”
- Which factors drive mobile user behavior in Austria?
- Are there differences in the motivators for adoption in different segments?
- To what extent do existing service quality and diffusion theories support theory development?

**Methodological Research Aims**
- Is the software program Mplus appropriate to estimate the proposed causal model?
- Does the data support the proposed model?
- Are a-priory grouping variables useful?
- Does the result of Latent Class Analysis reflect the results found through a-priori grouping?

**Practical Aims**
- What strategic implications derive for companies in order to offer good mobile service quality?
- What are the main antecedents of perceived service quality?
- What attributes do the services need to contain to be rated as high quality by specific target groups?
- What drives consumers’ loyalty?
- Are there any particular segments that need to be targeted differently by companies?
1.2 Implications

This research project is relevant for players in the mobile business arena and will help solve practical problems. The main participants in mobile markets who will profit from this survey are network operators, content and services providers, technology vendors and appliance manufacturers (Lehmann and Lehner, 2001). Enterprises planning to offer mobile commerce services must be aware of the primary concerns of consumers. Such knowledge can help these companies increase the usage of mobile services (Hung, Ku et al., 2003) and learn about service quality evaluation. Additionally companies can understand the resistance to services adoption among users and benefit from this information in order to increase the services’ quality evaluation based on the user needs identified in the empirical study. Once critical factors are known companies can develop better services and improve performance to fit customer needs.

Above that companies can develop effective marketing strategies to convince customers that mobile commerce is a convenient sales method and pricing strategies are found accordingly.

Mobile phone operators will gain information to better target their own clients. Operators are in a good position concerning mobile services, as they have information about their clients. It is important for the operators that the customers are satisfied otherwise they would need to handle a huge amount of complaints as they are the first point of contact for mobile phone users. Network operators integrate mobile data services in their range of products to increase average revenue per user. However, they still are not certain what particular customers seek in their services.

There are only few successful mobile content providers. Those have an interest in the research because it will contribute scientific answers to their every day problems. It is important for them to get suggestions on how to optimize the mobile content for their customers. They would receive empirically sound evidence on the quality of the service they provide.

With regard to theoretic implications the author creates a model for mobile service quality and consumer behavior. Due to the nature of the mobile medium, ubiquitous accessibility, existing models have to be reviewed and modified.

The body of knowledge from service quality\(^1\), diffusion of innovations and acceptance\(^2\) literature was reviewed and used as a basis for theory development. Guided by theory, modifications of the previously developed model will be presented. In addition, to test of the causal model multiple group analysis will give insights into different user segments.
The employment of latent class analysis allows data driven segmentation and will help identify user groups with significant differences.

1.3 Research Design

The research design consists of two major research phases, qualitative and quantitative:

In the first step, players in the m-commerce value chain are interviewed. Through literature review and expert interviews successful mobile services, their quality and content are identified and evaluated. The antecedents of service quality in the mobile data service industry and the customers' behavior are analyzed. On basis of that a causal model for mobile service quality and behavioral consequences is identified.

The second and major research phase tests the causal model based on expert interviews and literature review. The quantitative research shows if the developed hypotheses can be corroborated or need to be abandoned. In addition differences between customer segments are identified. Demographic and psychographic criteria are included in the segmentation process.

It needs to be mentioned that the findings are of limited validity. They just refer to the sample explored and are only valid until new findings are explored. Popper gave up the demand for absolute cognition and held the view that there will not be a definite knowledge that is able to explain everything. He is taking away the pressure of perfection; according to Popper the most important aspect is continuous critical exploration (Popper, 1976, 103ff).

After testing of the stipulated hypotheses some may be abandoned. Thus, some factors first assumed to be of importance for the quality perception of the mobile service may be falsified. Also, grouping variables hypothesized to prove successful for arriving with significant group differences may have to be reconsidered. Further literature review allows theory guided model modification.

---

1 Cronin, Brady et al., 2000; Cronin and Taylor, 1992; Cronin and Taylor, 1994; Donabedian, 2003; Grönroos, 1978; Grönroos, 2001; Kettinger and Lee, 1994; Loiacono, Chen et al., 2002; Oliva, Oliver et al., 1992; Oliver, 1997; Parasuraman, Zeithaml et al., 1988; Parasuraman, Zeithaml et al., 2005; Wolfinbarger and Gilly, 2003; Zeithaml, Berry et al., 1996; Zeithaml, Parasuraman et al., 2000.

2 Aijzen, 1991; Ajzen, 2001; Ajzen and Fishbein, 1980; Battacherjee, 2000; Bayarmaa and Boalch, 1997; Compeau and Higgins, 1995; Compeau, Higgins et al., 1999; Davis, 1989; Davis, Bagozzi et al., 1992; Goodhue and Thompson, 1995; Koufaris, 2002; Legris, Ingham et al., 2003; Loiacono, Chen et al., 2002; Rogers, 1995; Venkatesh and Davis, 2000; Venkatesh, Morris et al., 2003.
For the explorative research, expert interviews and literature review are the underlying methods. In the course of the quantitative research, primary data is collected via an online survey. The causal model is tested using the software package Mplus. This software tool also includes multiple group functions and a latent class analysis procedure employed for the identification of groups within the sample.

### 1.4 Structure

The book consists of five major parts. Each of them will be explained in more detail in this section:

First, the introduction provides an overview of the research problem, the research design and the expected implications.

Second, the research approach of the explorative research phase is explained, followed by a discussion of the qualitative survey of this study. The next section presents the field of m-commerce, combined with findings of the qualitative survey. A general introduction to the topic of mobile services is given. This provides the reader with a state of the art introduction to mobile commerce, the mobile commerce value chain, and successful mobile services.

The following chapters provide the theoretical building blocks which have a bearing in service quality and consumer acceptance research. These building blocks are presented and discussed. Subsequently further constructs relevant for m-service user behavior are introduced. The constructs are drawn together to propose a conceptual model of mobile services usage. Based on this the full model and consequently the research hypotheses are developed. Apart from providing the theoretic basis for the model development also the methodological base is provided. Chapter 5.6 gives an introduction to causal modeling and its application in marketing research.

The chapters dealing with the empirical research phase provide the operationalization of the constructs, followed by a detailed description on how the quantitative research was carried out. They shed light on how the survey is conducted, and explain general research challenges, the sampling, and data collection process. The analysis first presents descriptive findings and insights into the sample profile. Then the hypothesized model is estimated. The measurement model is evaluated to find validity defects. A test of the model with dichotomized variables provides further insights in the quality of the measurement instrument. Through further literature review modified models are identified and also tested. Further analyses are carried out to detect heterogeneity. First a-priori criteria are chosen as grouping variables for multiple group analysis. Furthermore latent class analysis arrives with segments that are detected based on the data structure.
The concluding chapter discusses the results and summarizes the main findings. Furthermore, there is a discussion of implications for industry and future research. The book closes with a list of references and an appendix (questionnaire).