

ZfTM-Work in Progress Nr. 96:

**Attribute Perceptions as Factors Explaining Mobile Internet  
Acceptance of Cellular Customers in Germany  
– An Empirical Study Comparing Actual and Potential Adopters  
with Distinct Categories of Access Appliances**

**Torsten J. Gerpott\***

© 2009

\* Univ.-Prof. Dr. Torsten J. Gerpott, Lehrstuhl Unternehmens- und Technologiemanagement, Schwerpunkt Telekommunikationswirtschaft, Universität Duisburg-Essen, Lotharstr. 65, D-47057 Duisburg.



## Abstract

Although demand for Internet access through cellular networks and portable appliances, i.e. mobile Internet (MI), has recently soared in many countries, the majority of mobile network operator (MNO) customers has still never used MI. Therefore, it is important to gain a better understanding of (1) how MNO customers perceive attributes of MI offers, (2) how these perceptions are related to MI acceptance and (3) the extent to which these judgments and relationships differ as a function of an individual's adoption status (actual compared to potential MI user) and the appliance category employed to access MI (handset compared to laptop). This study analyses these issues by drawing on MI attributes deduced mainly from diffusion of innovation (DOI) and information economic (IE) literature and by using data collected from a survey of 525 effective and 540 potential MI users in Germany. The multivariate results show that the perceived relative functional advantage and communicability of MI offers were significantly positively and their trialability was significantly negatively correlated with MI acceptance in both customer groups. Overall, perceived DOI-based attributes explained MI acceptance better for actual than for potential users. The share of search qualities relative to that of credence qualities which respondents assigned to MI had a small, but significant positive effect on MI acceptance among potential users. The effectively used or preferred appliance category for MI access exerted strong influence on DOI-based MI attribute assessments, especially among actual adopters: MNO customers who (prefer to) use a laptop to obtain MI access perceived MI features more favorable than persons who (prefer to) use a handset as their primary MI access device. These findings provide insights for MNO and appliance vendors on measures which may effectively promote the acceptance of MI.

**Keywords:** Advanced mobile data services; Attribute perceptions; Diffusion of innovation concepts; Germany; Information economic concepts; IT innovation; Mobile appliance categories; Mobile Internet; Pre-adoption; Post-adoption; Technology acceptance; User survey.



## Contents

<b>1.</b>	<b>Background and study objective</b> .....	1
<b>2.</b>	<b>Specification of basic concepts, hypotheses, and research questions</b> .....	6
2.1.	Mobile Internet.....	6
2.2.	Theoretical perspectives on MI attributes as determinants of MI acceptance.....	7
2.2.1.	Technology Acceptance Model and Diffusion of Innovation concepts.....	7
2.2.2.	Information economic concepts.....	14
2.3.	Role of MI customer appliance category.....	17
<b>3.</b>	<b>Empirical methods</b> .....	18
3.1.	Data collection procedure.....	18
3.2.	Respondent characteristics.....	20
3.3.	Variable measurements.....	22
<b>4.</b>	<b>Empirical results concerning the research hypotheses and questions</b> .....	27
<b>5.</b>	<b>Discussion and implications</b> .....	33
<b>6.</b>	<b>Limitations</b> .....	37
	<b>References</b> .....	39



## 1. Background and study objective

Market researchers report that demand for Internet access and services through cellular communication networks via various portable appliances, i.e. mobile Internet (MI), has recently started to soar in many countries. Further strong MI subscriber growth is expected in the near future. According to IDATE (2009, p. 1), the number of MI customers in Europe (the U.S.) will expand from about 70 million (35 million) at the end of 2008 to more than 160 million (110 million) at the end of 2012. Particularly for Germany, surveys of large samples which represented the population of residential customers of the four mobile network operators (MNO) in demographic respects revealed that the share of MI adopters in the total of cellular users grew from 3.6% in January 2007 to 9.2% in January 2008 and reached 13.7% in January 2009 (tns infratest, 2009, p. 6). Main drivers of the current MI uptake include improvements in performance and price of MI-enabled customer premises equipment, expansions in the geographical availability of broadband mobile data transmission technologies (e.g., EDGE, HSPA) in MNO infrastructures, increases in the quantity and quality of MI services, and substantial decreases of end-customer MI access and use prices (Kim et al., 2008, p. 109; Verkasalo, 2008, p. 40).

However, even the most recent German MI adoption figure quoted above as well as ITU statistics<sup>1</sup> on “mobile broadband subscribers per 100 inhabitants” (ITU, 2009, p. 79) for other European or North American countries at the end of 2007 – which range from 43.2% in Luxembourg to 1.7% in the Czech Republic – imply that the vast majority of MNO customers has never used MI (yet). Compared to Japan and South Korea for which the MI penetration statistic of the ITU amounted to 56.8% and 48.6%, respectively, at the end of 2007 (ITU, 2009, pp. 93-94), MI acceptance in many Western developed nations is still way behind the Asian leaders (see also Minges, 2005; Funk, 2007 for similar conclusions derived from other data sources). For instance, a survey of a sample which was representative for residents of Germany and

---

<sup>1</sup> The ITU sets this indicator as “subscriptions to mobile cellular networks with access to data communications (e.g., the Internet) at broadband speeds (here defined as greater than or equal to 256 kbit/s in one or both directions) ... irrespective of the device used to access the Internet” (ITU, 2009, p. 79).

conducted in 2008 indicated that even though 62% of the participants owned a cellular handset with the technical capability to access MI, only 12% of these individuals had effectively used this capacity (Mohr, 2008, p. 12). In addition, the use intensity of quite a few MI customers is shallow, and a considerable share of customers even completely ceases to use MI after its initial adoption (Lee et al., 2007, p. 15; Kim et al., 2008, p. 110).

Nevertheless, MNO continue to set their hopes on MI as a market arena with high subscriber and revenue growth potentials (BITKOM, 2009). Taking into account these growth aspirations and the MI “utilization gaps” illustrated above, a thorough understanding of why MNO voice customers expand their demand to innovative MI offerings or refuse to do so, is evidently of pivotal interest for both MNO managers involved in their firms’ MI strategy development and scholars working in the fields of innovation, information technology (IT) systems, or consumer psychological foundations of marketing. Thus, it should not come as a real surprise that a substantial number of recent scholarly studies have attempted to empirically identify factors significantly associated with criteria suspected to capture the degree of acceptance of MI in a narrow sense or of other more or less advanced mobile data services (MDS) or devices (see section 2.1.).

From an overall research design angle this previous work may be systematized depending on whether it did not or did deliberately compare MI attribute perceptions and acceptance determinants across mobile customer groups varied with respect to their adoption status. Non-comparative MI acceptance studies, i.e., “single sample investigations”, may be further divided subject to whether the work focused on potential users (pre-adoption research), actual users (post-adoption research), or a “mixed” sample including both potential and effective users. Pre-adoption research typically scrutinizes potential customers’ behavioral intentions to use MI in general or specific advanced/value-added MDS as dependent criteria. Current examples of this category of investigations are Chen (2008), López-Nicolás et al. (2008), Lu et al. (2008), Chen et al. (2009), Kim and Garrison (2009), and Mallat et al. (2009). Post-adoption analyses tackle with determinants of actual users’ intentions to continue with MI or other more or less advanced MDS in the future. Hong et al. (2006), Bouwman et al. (2007), Lee et al. (2007), Hong et al. (2008), Kim et al. (2008), Bouwman et al. (2009), and