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### Abstract

One of the first commercial mobile services was mobile banking. This paper explores the state-of-the-art of m-banking in Germany. It initially presents a brief discussion of the main characteristics of German banking practices, which is followed by an overview of the mobile services offered by the top 100 banks in the country. In addition, a detailed analysis the m-services offered by Postbank, Hamburg's Saving Bank, and the DZ Bank is presented. Finally, a discussion of the results is guided by a comparison with the findings obtained in previous studies undertaken in Germany (Wolf, 2003) Japan (Scornavacca & Barnes, 2004) and New Zealand (Scornavacca & Cairns, 2005). The paper concludes with a discussion about the future of mobile banking in Germany.

**Keywords:** Mobile Banking; Services; Germany; Strategy; M-commerce

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## Abstract

One of the first commercial mobile services was mobile banking. This paper explores the state-of-the-art of m-banking in Germany. It initially presents a brief discussion of the main characteristics of German banking practices, which is followed by an overview of the mobile services offered by the top 100 banks in the country. In addition, a detailed analysis the m-services offered by Postbank, Hamburg's Saving Bank, and the DZ Bank is presented. Finally, a discussion of the results is guided by a comparison with the findings obtained in previous studies undertaken in Germany (Wolf, 2003) Japan (Scornavacca & Barnes, 2004) and New Zealand (Scornavacca & Cairns, 2005). The paper concludes with a discussion about the future of mobile banking in Germany.

*Keywords:* Mobile banking; services; Germany; strategy; m-commerce

## 1. Introduction

The number of mobile phone users worldwide reached the one billion mark in 2002 (Barnes & Huff, 2003). In Japan, already seven out of 10 people have cell-phone accounts, and in countries such as Italy, Norway, Sweden and the United Kingdom, the market penetration of mobile phones has already exceeded 100% (Sultan & Rohm, 2005).

One of the first commercial applications of the mobile commerce was mobile banking (m-banking) (Barnes & Corbitt, 2003; Laukkanen & Lauronen, 2005). M-banking is a further development upon earlier customer channel extensions such as phone banking and online banking (Barnes & Corbitt, 2003; Laukkanen & Lauronen, 2005; Pousttchi & Schurig, 2004). It can be defined as a channel whereby customers interact with a bank through a mobile device (e.g. cell phone or PDA) (Scornavacca & Barnes, 2004).

Recent studies by Scornavacca and Barnes (2004) and Scornavacca and Cairns (2005) explored the state-of-the-art of mobile banking in Japan and New Zealand. The investigations found that the Japanese banks had recently embarked on a multi-channel strategy that combined telephone banking, Internet banking, and m-banking services while in New Zealand m-banking remains in an embryonic stage.

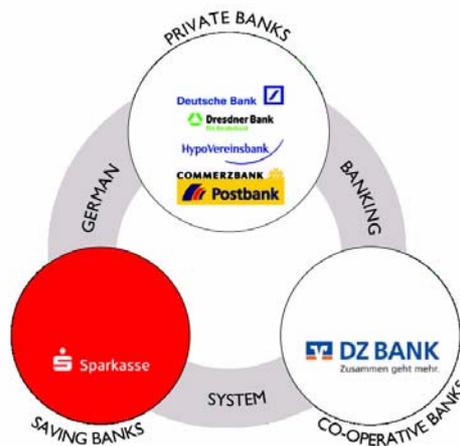
An examination of the current state-of-the-art of mobile banking services in a European nation such as Germany is an interesting and opportune addition into this research effort. In Europe, mobile penetration rates are around 80% and Germany is the largest European mobile market with 50 million mobile users (Forrester, 2005b).

This paper explores the state-of-the-art of m-banking in Germany. A brief discussion on the main characteristics of German banking system is followed by an investigation of m-banking services offered by the top 100 German banks. A detailed analysis of the mobile services offered by three German banks is provided– Postbank, Hamburg’s Saving Bank, and the DZ Bank. A discussion of the results is guided by a comparison with previous research done in Germany (Wolf, 2003) Japan (Scornavacca & Barnes, 2004) and New Zealand (Scornavacca & Cairns, 2005). The paper concludes with a discussion about the future of mobile banking in Germany.

## 2. The German Banking Environment

Germany’s banking industry embraces more than 2,200 credit institutions, representing 30% of the European Union’s total (Economist, 2004). On average, in Germany there are about 60 bank branches for every 100,000 inhabitants. Other European nations such as Britain, Finland, Ireland and Sweden average at most 25 branches per 100,000 (Economist, 2004).

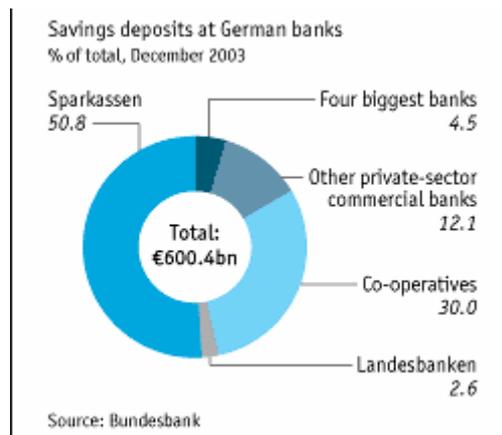
Figure 1 illustrates the German banking system. It consists of three main categories: private banks, saving banks, and co-operative banks.



*Figure 1: German banking system*

### *Private Banks*

Measured by the market capitalisation, the top four German banks are private financial institutions Deutsche Bank, Dresdner Bank, Hypovereinsbank (HVB), and Commerzbank (Bank, 2004). These global players offer services to private and corporate customers and earn a reasonable share of their profits from their investment banking activities (Economist, 2004). It is interesting to notice that these top four German Banks only account for 4.5 percent of all saving deposits in Germany (Economist, 2004). Figure 2 shows the distribution of savings deposits held in 2003.



**Figure 2: Savings deposits at German banks (Economist, 2004)**

### *Saving Banks*

The saving banks (Sparkassen) represent the biggest share of the domestic German market, holding 50.8 percent of all saving deposits in Germany at their 500 saving banks (Economist, 2004). The size of each saving bank varies due to their location and customer numbers. Saving banks in large cities tend to have large customer bases and vast saving deposits while saving banks in rural areas tend to be much smaller.

### *Co-operatives*

The third category of the German banking system consists of 1400 co-operative banks that account for 30 percent of all deposits in the country. The DZ-Bank was formed in 2002 and acts as a “Central bank” for the co-operative banks. Traditionally co-operatives concentrate on private customers as well as SME’s.

## **2.1 Banking in Germany**

German banks distribute their products via multi-channels (Bahadur, Desmet & v. Bommel, 2005). According to Forrester’s Research (2005a), 84 % of German consumers make use of Automatic Teller Machines (ATM) - the most popular transaction channel. Banks have recognised this trend and reacted with strategic alliances. For instance large private banks such as Commerzbank, Deutsche Bank, Dresdner Bank, Hypovereinsbank, and the Postbank have established an alliance called “cashgroup”. This enables bank customers to withdraw money without paying extra fees at 7,000 ATM’s throughout Germany (Cashgroup, 2005). Similar alliances have been made among saving banks as well as co-operative banks. Figure 3 presents the usage of the most common banking channels in Germany.

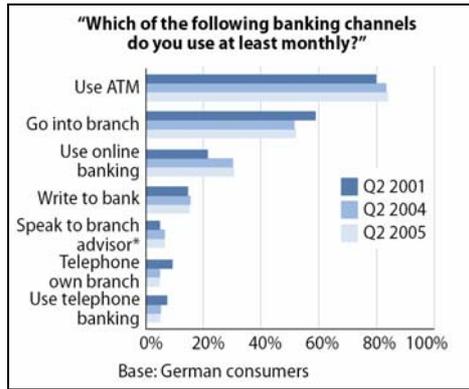


Figure 3: How German consumer use banking channels (Forrester, 2005a)

Online banking is utilized by only 30 percent of consumers (Forrester, 2005a). On the other hand, 52 percent of them still rely on traditional physical branch services to satisfy their banking needs – despite the fact that automated channels such as ATM’s or online banking offer lower transaction fees (Forrester, 2005a).

### 3. Mobile Banking in Germany

This section examines the m-banking channel in detail. It is divided into four parts. First, it is explained how customers access banking services through a mobile phone in Germany. Second, an overview of the services provided by the top 100 banks is provided. This is followed by a detailed analysis of the m-services offered by the following banks: Postbank, Hamburg's Saving Bank, and the DZ Bank. Finally, a summary of the available services is drawn.

#### 3.1. Accessing m-banking services

In order to access m-banking services, customers should own a mobile handset and subscribe to a wireless service provider (WSP). In Germany, there are four major wireless services providers: T-mobile, Vodafone, E-Plus, and O2. Figure 4 illustrates the market share of each player (Solon, 2005).

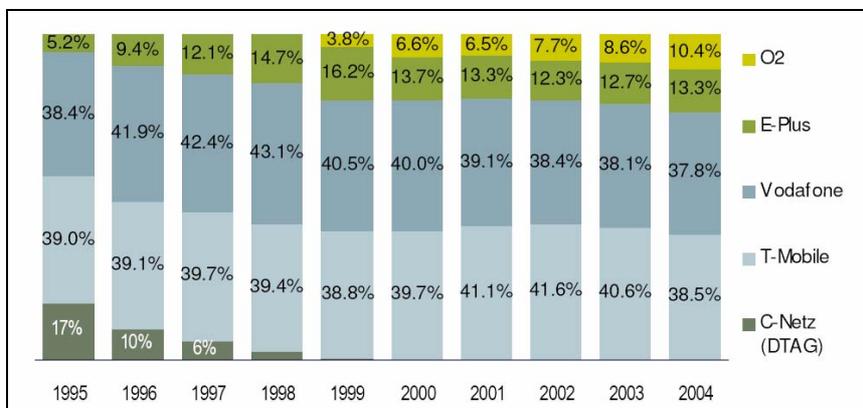
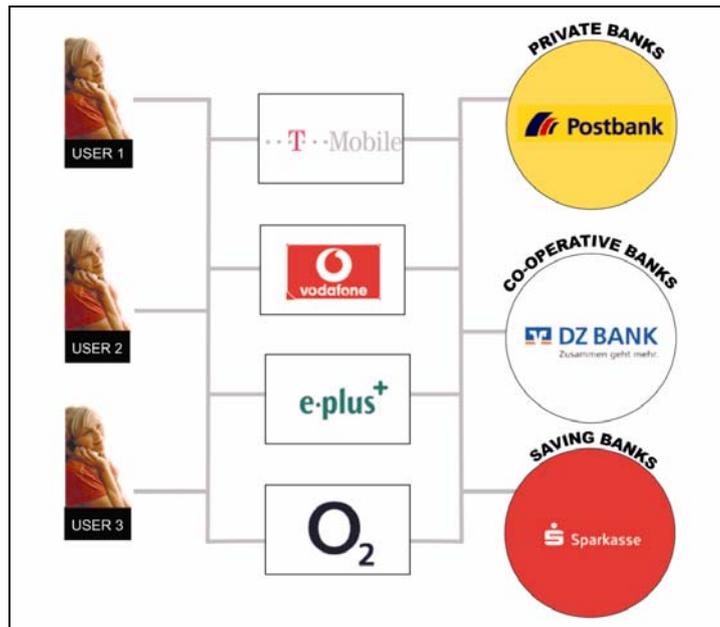


Figure 4: Market share of German wireless service providers (Solon, 2005)

All German WSPs have recently introduced 3G/UMTS services. The new data transmission rates appear to close the existing gap between “wired” Internet access and mobile Internet. For instance E-Plus offers a “flatrate” for unlimited data transmission with transfer rates up to 384 Kbits/s (E-Plus, 2006). Apart from general data/network usage none of these four network providers charges customers for m-banking services separately. Figure 5 illustrates how mobile banking services are accessed by German customers. All of the banks have websites that can be viewed from any device, independently of the wireless service provider.

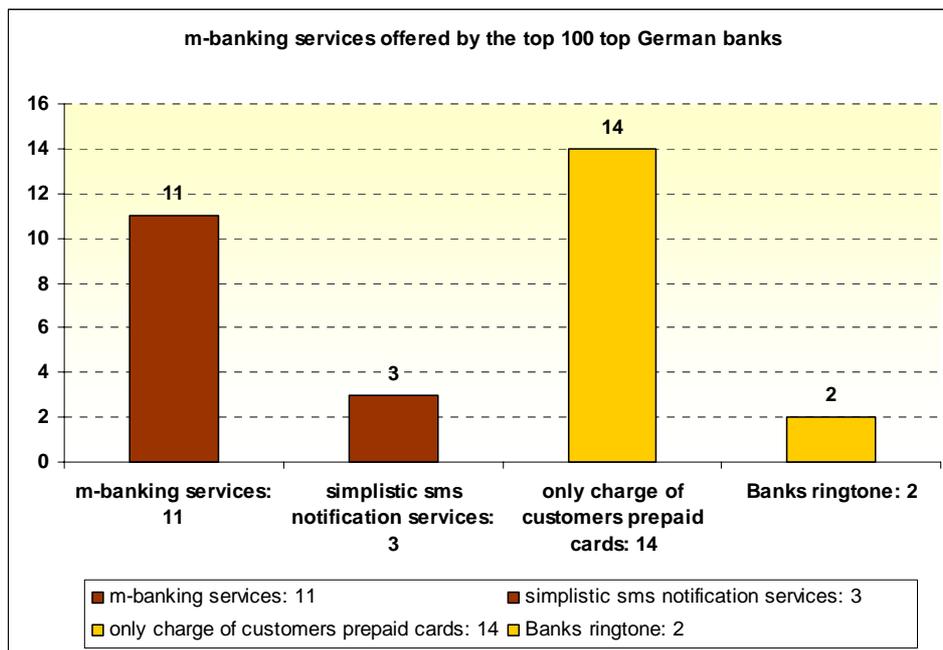


*Figure 5: Accessing m-banking services in Germany*

### 3.2. An overview of the m-services offered by the top 100 German banks

Based on Bank’s (2004) list of the top 100 banks in Germany a large research effort was undertaken in order to identify the mobile banking services offered by each of those banks. All one-hundred banks websites were carefully scrutinized and an additional key-word search was completed. As a result, 30 of the 100 banks investigated were identified to be offering some kind of mobile service. Interestingly, almost half of them (14) were only offering the service of recharge of mobile prepaid cards. Moreover, two banks only offered to their customers a service that can hardly fit in the definition of m-banking: the download of “ringtones”.

Figure 6 shows the total number of m-banking services offered by the top 100 German banks. It should be noticed that SMS-banking- and mobile banking services are listed separately although both fit into the definition of m-banking services.



**Figure 6: M-banking services offered by the top 100 German banks**

Surprisingly only 14 German financial institutions allow their clients to interact via the mobile channel. Three out of these 14 (Citibank, Sparda Bank Baden Wuerttemberg and Spada Bank Suedwest) offered very simplistic SMS-notification services. Most banks do not charge customers extra fees for SMS services.

It is interesting to compare these results with findings of previous research undertaken in Germany on m-banking availability (Wolf, 2003). Although Wolf (2003) focused on risks of IS and its management, she identified 24 German banks that offered mobile banking services to its customers in 2003. Table 1 compares the findings of Wolf's (2003) and this research effort. Two banks identified by Wolf (2003) were excluded from this list since one (Deutsche Bank 24) no longer exist the other (Nassauische Sparkasse) does not belongs to the top 100 German banks list.

Observe that between 2003 and 2006 only seven banks have integrated m-banking services to their portfolio. During the same period, 15 banks have closed their mobile channel to their customers (including the top four private banks - Deutsche Bank, Dresdner Bank, Hypovereinsbank, and Commerzbank).

**Table 1: German banks offering mobile services in 2006**

Banks	M-banking services	
	2003 (Wolf, 2003)	2006
Hamburger Sparkasse	Yes	Yes
Kreissparkasse Koeln	Yes	Yes
Postbank AG	Yes	Yes
Sparkasse Krefeld	Yes	Yes
Stadt- und Kreissparkasse Leipzig	Yes	Yes
Stadtsparkasse Muenchen	Yes	Yes
DZ Bank (DGZ Deka Bank previously)	Yes	Yes
Wuestenrot Bausparkasse, Ludwigsburg	No	Yes
Bremer Landesbank	No	Yes
Landesbank Saar	No	Yes
Mittelbrandenburgische Sparkasse, Potsdam	No	Yes
Citibank AG	No	Yes
Sparda Bank Baden Wuerttemberg, Stuttgart	No	Yes
Sparda Bank Suedwest, Mainz	No	Yes
Baden Wuerttembergische Bank AG	Yes	No
Bankgesellschaft Berlin AG	Yes	No
Bayerische Hypo-und Vereinsbank AG	Yes	No
Berlin-Hannoversche Hypothekenbank AG	Yes	No
Bfg Bank AG/SEB AG	Yes	No
Commerzbank AG	Yes	No
Deutsche Bank (24)/AG	Yes	No
Dresdner Bank AG	Yes	No
Frankfurter Sparkasse (1822)	Yes	No
Landesbank Baden Wuerttemberg	Yes	No
Norddeutsche Landesbank Girozentrale	Yes	No
Oldenburgische Landesbank AG	Yes	No
Stadtsparkasse Dortmund	Yes	No
Sparkasse Nuernberg	Yes	No
Volkswagen Financial Services	Yes	No
<b>Total banks offering m-banking services</b>	<b>22</b>	<b>14</b>

The data on Table 1 indicates a clear downward trend on the availability of m-banking services in Germany. Unfortunately there is no evidence why and for what reasons many banks have abandoned their services. Deutsche Bank, for instance, argued that it cancelled its m-banking activities due to the lack of customers' use (Stein, 2004). Perhaps many German banks were misled into a "mobile hype" and rolled out their m-banking services in a premature stage – at a time that users were not familiar with mobile services and the technological platform had far too many limitations such as ease of operation, security for transactions, costs, display type, and the relatively impoverished WAP sites. Perhaps the German banking industry may soon redevelop a stronger m-banking channel as the technological platform moves to 3G.

### 3.3. Examples of m-banking services available in Germany

This section investigates m-banking services offered by three different banks. One bank from each “category” (Figure 2) was selected: Postbank (representing private banks), Hamburg’s savings bank (Haspa) (representing saving banks), and DZ Bank (representing co-operatives banks). The selection criteria were primarily based on the importance of each organization in its own category and availability of m-banking services.

#### 3.3.1. Postbank

The Postbank was originally a State owned bank and a subsidiary of the Deutsche Post. Only recently it has been separated from the Deutsche Post - however both companies still maintain a joint sales strategy. As a result, Postbank is offering its services and products in over 9,000 branches. Additionally, it maintains 780 Postbank Centres, where customers are serviced by over 2,000 specially trained financial service advisors. The Postbank has positioned itself as a multi-channel bank by adding online, phone, and mobile banking to branch banking in order to provide customers with easier access through all channels.

One way to reach customers is the m-banking / m-brokerage channel. Postbank offers the following services:

##### *m-banking*

- Checking account balances
- Checking transaction status quo plus information on previous transactions
- Executing fund transfers / transactions
- Checking credit card information
- Account maintenance and administration
- PIN alteration and TAN lock out for the respective bank account

##### *m-brokerage*

- Checking stock prices
- Checking custody account information
- Displaying custody accounts as chart pictures
- Re-ordering or re-selling shares
- Buying shares on the German stock exchanges
- Buying and sell investment trusts
- Subscription for upcoming IPO’s
- Checking custody order information
- PIN alteration and TAN lock out for the respective custody account

If customers are registered as online customers they do not need to register separately for m-banking services. Postbank does not charge extra fees for its mobile services except the SMS notification services.

Figure 7 shows the Postbank’s m-banking services logon screen (A) as well as the Postbank mobile menu (B) that users can retrieve on their mobile devices. Customers can choose between the following options: a) mobile banking, b) mobile brokerage, c) ATM/branch locator, d) security policies.



**Figure 7: Postbank's m-banking logon screen**

Postbank also offers a SMS notification service. Customers access their online bank accounts through the Internet and set up the SMS notification services. Figure 8 illustrates Postbank's SMS notification services.

<p><b>So einfach gehts:</b></p>			<p>Notifications can be setup for the following situations:</p> <ul style="list-style-type: none"> <li>• Incoming transfer into current or saving account</li> <li>• The account balance falls below a fixed limit</li> <li>• Stocks top or fall below a fixed limit</li> <li>• Stock order has been executed</li> <li>• A defined account movement has happened</li> </ul>
<p>Bei Postbank <i>direkt</i> anmelden</p>	<p>Kontosignale bequem online einrichten</p>	<p>Alle Konten &amp; Depots per SMS im Blick</p>	

**Figure 8: Postbank's SMS notification services**

Postbank charges nine EUR cents per SMS and customers can set up whether they want recurring services or just use it once. Additionally Postbank offers a download link for customers to install software onto their mobile devices for offline account administration. This software is called "StarMoney Mobile 2.0" and Postbank promotes it in conjunction to T-mobile (Postbank, 2006).

### 3.3.2. Hamburger Sparkasse (Hamburg saving bank)

The Hamburger Sparkasse (Haspa) looks back to its history of 178 years offering banking services. Haspa is the biggest German saving bank and counts 5,800 employees while holding total assets of 31.3 billion as per 31.12.2004 (Haspa, 2006). Over 50 percent of Hamburg's citizens hold an account with Haspa. Like Postbank, Haspa offers a wide range of mobile-banking services:

### *m-banking*

- Checking account balances
- Checking transaction status and information on previous transactions
- Executing transactions
- SMS messages orders (open text) for various inquiries such as new address notification
- PIN alteration and TAN lockout for the respective account

### *m-brokerage*

- Checking stock prices
- Checking custody account information

Haspa also provides customers with a comprehensive manual for its mobile and online services.

### *3.3.3. Co-operative banks*

The DZ BANK was formed by merging the two co-operative central banks GZ-Bank and DG BANK on 1st September 2001 (DZ, 2006). It is the fifth largest bank in Germany and acts as the central bank for approximately 1,200 Volks- and Raiffeisenbanken (Co-operatives). DZ Bank offers relevant products for co-operative banks and coordinates their services in order to optimise operating processes. The co-operatives are organised as alliances and offer their services throughout most German states. The co-operatives banks are generally used by private customers and SME's. The DZ Bank maintains a central Internet portal (<http://www.vr-network.de>) where customers can retrieve information about products offered by each of the co-operative bank.

The DZ Bank itself does not provide any mobile banking services as it only acts as a headquarter/hub for all co-operative banks. However, its portal (VR network) offers the following services which can be accessed by customer of co-operative banks.

Services available on mobile phones:

- Account balances
- Transaction status quo plus information on previous transactions
- Password administration

Additional services available for wireless PDAs

- Fund transfers / transactions
- Transaction templates
- PIN alteration and lock out for the respective bank account

The convergence given by one portal for all co-operative banks allowed the DZ Bank to provide a consistent and efficient service for its customers. The following section summarises the m-banking services of these three banks.

### 3.4. Summary of M-banking services in Germany

The case studies of the three German banks revealed that each bank has integrated mobile banking into a multi-channel strategy that includes branch banking, Internet banking, phone banking, and mobile banking services. Still, the portfolio of services offered by each of the banks varies significantly - especially since the Postbank offers by far more services than Haspa or DZ Bank. In addition the software-alliance between Postbank and T-mobile is providing an interesting value proposition which combines online and offline applications. Table 2 summarises the m-banking services offered by each of the three banks investigated above.

*Table 2: Summary of m-banking services provided by German banks*

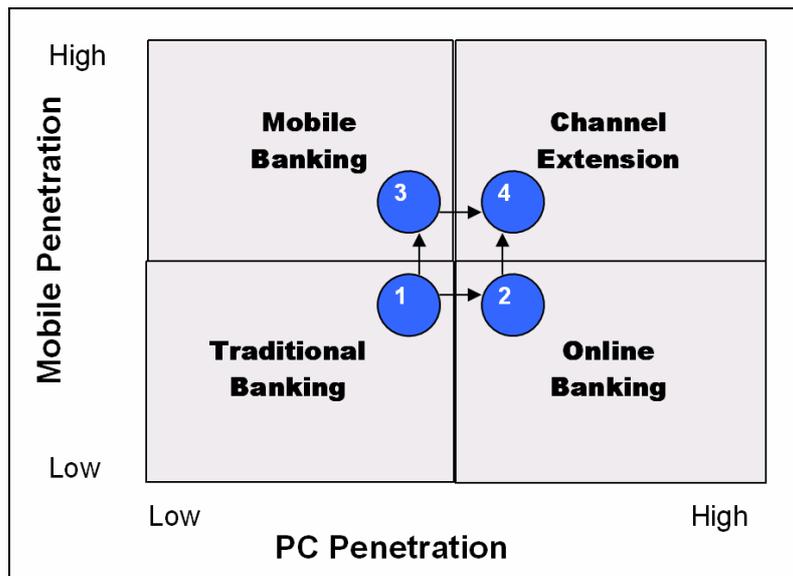
Services	Postbank	Haspa	DZ Bank
<b>m-banking services</b>			
Check account balance	Yes	Yes	Yes
Check transaction status quo plus information on previous transactions	Yes	Yes	Yes
Fund transfers / transactions	Yes	Yes	PDA only
Check credit card information	Yes	No	No
Account maintenance and administration	Yes	Yes	PDA only
PIN alteration and TAN lock out for the respective bank account	Yes	Yes	PDA only
<b>m-brokerage services</b>			
Check stock prices	Yes	Yes	No
Check custody account information	Yes	Yes	No
Display custody accounts as chart pictures	Yes	No	No
Re-order or re-sell shares	Yes	No	No
Buy shares on the German stock exchanges	Yes	No	No
Buy and sell investment trusts	Yes	No	No
Subscription for upcoming IPO's	Yes	No	No
Check custody order information	Yes	No	No
PIN alteration and TAN lock out for the respective custody account	Yes	Yes	No

## 4. A strategic perspective on German m-banking services

Now that the nature of m-banking services in Germany has been considered, the strategic implications of these services for both banks and customers can be evaluated.

### 4.1. Strategic development model

Scornavacca and Barnes (2004) applied Barnes' (2003) m-banking strategic model (see Figure 9) to the Japanese m-banking market. Subsequently, Scornavacca and Cairns (2005) used the same model in their research in the New Zealand market place. Barnes' (2003) m-banking strategic model categorises the potential development of m-banking services in different markets according to the penetration of mobile telecommunications and personal computer technology. It certainly provides a useful and incisive platform for assessing the German experience.



**Figure 9: Strategic model for m-banking-Germany**  
(Adopted from Scornavacca and Barnes, 2004)

Even though the information and communication technologies are well developed in Germany, most German bank costumers still rely on traditional branch banking. It is interesting to observe that most German banks have implemented a multiple channel strategy to interact with their customers – offering branch banking, ATM services as well as online- and telephone banking (Forrester, 2005a).

In 2004 the PC penetration rate in Germany was 48 percent while 42 percent of all Germans had access to the Internet (ITU, 2004). The online banking channel is already being utilised by 30 percent of German bank consumers (Forrester, 2005a). Not surprisingly all 100 banks investigated have web-portals to service customers or inform them about their services. This development from traditional banking to online banking is shown in the Figure 9 by the move from step 1 to 2. Interestingly Scornavacca and Cairns (2005) identified the same development in the New Zealand environment, while in Japan mobile banking followed the traditional branch banking (Scornavacca & Barnes, 2004).

While the level of m-banking services offered in Germany is still at a stage of infancy, the high penetration rate of mobile devices in Germany is creating an extraordinary opportunity for banks to leverage the benefits of mobility. Perhaps the German banking industry is primed to soon develop a stronger m-banking channel as the technological platform moves to 3G. This is illustrated by the move to step 3 in the figure above.

It is then likely that banks will adopt a multi-channel strategy. Such an approach can be called Channel Extension, where banks incorporate multiple channels including traditional, online and mobile banking (step 4).

#### 4.2. Strategic benefit framework

The strategic benefits of m-banking services in Germany are another aspect of service development worthy of further investigation. To this end, Barnes (2003b) provides a simple framework for evaluating the direct and indirect strategic benefits from m-banking. In all, there are five main types of benefits. This framework was also previously used to analyse the direct and indirect strategic benefits from m-banking in Japan (Scornavacca and Barnes, 2004) and New Zealand (Scornavacca and Cairns, 2005). Table 3 applies the strategic framework to the German example, examining the indirect and direct benefits of Postbank, Hamburger Sparkasse, and DZ Bank whether such benefits are apparent in each of the banks.

*Table 3: The strategic benefits of German m-banking services*

	Postbank	Hamburger Sparkasse (Haspa)	DZ Bank
<b>Indirect benefits</b>			
Cross-selling	x	x	x
Cheaper customer acquisition	x	x	x
Customer loyalty	✓	✓	✓
<b>Direct benefits</b>			
Customer benefits	✓✓	✓	✓
Cost reduction	x	x	x

**Key:** x = no evidence; ✓ = low; ✓✓ = medium; ✓✓✓ = high

As Table 3 demonstrates, the main beneficiaries of m-banking services in Germany are the customers. The data analysed provide no evidence the German banks generated benefits through cross selling as well as cheaper customer acquisition. By contrast, in Japan Scornavacca & Barnes (2004) identified cross selling benefits as they were distributing wider product ranges through their m-banking applications. There is also no evidence of cost reduction, though this could have occurred. It is likely though that as the m-banking channel develops and user numbers increase there will be a resultant cost reduction for banks.

At a nominal cost, customers receive an extra banking channel with varying services. Each bank currently offers different services, with Postbank dominating in terms of services offered. By contrast, in Japan there has been a swift replication of mobile service offerings among banks which has created a levelled playing field (Scornavacca & Barnes, 2004). At the moment, the uneven playing field in Germany presents an opportunity for each respective bank to leverage benefits. This attains particularly to Postbank as the market leader, but also to the other banks that may seek to enter a niche market. A similar situation was found by Scornavacca & Cairns (2005) in the New Zealand marketplace.

There is some indicative evidence that any of the banks have implemented an m-banking strategy to promote customer loyalty. By offering another banking channel, the banks are making their services more accessible for their existing customers (whether or not it causes a reduction in the banks own costs).

## 5. Conclusions

The German m-banking market is still in a stage of relative infancy. In comparison with Scornavacca & Barnes' (2004) study, clearly, the German m-banking portfolio is far less developed than its Japanese counterparts. However, the German m-banking portfolio is a few steps ahead of its counterparts in New Zealand (Scornavacca & Cairns, 2005).

Since Wolf's research in 2003 only seven banks have integrated m-banking services to their portfolio. During the same period, 15 banks have closed their mobile channel to their customers - despite the massive proliferation of mobile devices in Germany during the same period. Surprisingly even major private banks such as Deutsche Bank, Commerzbank, Dresdner Bank, and Hypovereinsbank have abandoned their m-banking activities since 2003.

Currently, in Germany, only 14 banks out of a hundred banks studied offer m-banking to their customers. These 14 banks all have a very distinct strategy and present a diverse range of services. These services are provided to customers independently of the wireless services providers.

Of the three banks' portfolios analysed, Postbank offers the most comprehensive service. In addition it is the only bank that developed an alliance with a mobile carrier (T-Mobile). On the other hand, Hamburger Sparkasse and DZ Bank offer a quite limited and similar m-services portfolio. Scornavacca & Cairns (2005) also found in New Zealand a similar market situation with one bank leading m-banking developments in the country.

Since Germany has a high level of mobile penetration, the foundation for a more comprehensive m-banking market has already been laid. It is therefore, likely that m-banking will develop at a more rapid pace in future years. As m-banking continues to develop, and with the strength of online banking in Germany, it is likely that m-banking will become a part of a multi-channel strategy. New billing plans such as the E-Plus "flat-rate" for unlimited data transmission offer new opportunities for customers as well as for banks (E-Plus, 2006). So far banking transactions conducted on mobile device had been expensive for customers. If "mobile flat-rates" become widely accepted in Germany consumer patterns may change and cause an increase in demand of m-banking services. The emergence of low cost Internet flat-rates in combination with high PC penetration rates in Europe encouraged banking customers to use the online channel (Barnes, 2003). Perhaps the same trend may happen with the mobile channel.

The next three years will provide important evidence regarding the future of m-banking in Germany. Besides the recent introduction of 3G devices, there is considerable speculation regarding future integration between wireless service providers and financial institutions. Based on the lessons learned from the initial "mobile hype", the German banking industry may soon develop a much stronger and sustainable m-banking channel for its customers.

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