Bank adoption of mobile banking: stakeholder perspective

Jennifer Mullan, Laura Bradley and Sharon Loane
Department of International Business, Ulster University, Derry, UK

Received 29 September 2015
Revised 15 March 2016
16 August 2016
23 October 2016
Accepted 3 December 2016

Abstract

Purpose – Bank adoption of mobile banking globally remains sporadic. Factors influencing this remain under researched. The purpose of this paper is to explore drivers and barriers of bank adoption of mobile banking from a stakeholder perspective.

Design/methodology/approach – Using diffusion of innovation (DOI), a mixed method study was conducted. Data were collected using blogging to inform a two-round modified Delphi study. The opinion of 72 members from six stakeholder industries was sought.

Findings – The results indicate that DOI theory is still applicable within mobile environments in helping to understand the diffusion of mobile banking. Key drivers of bank adoption were global mobile phone penetration, competitive advantage, customer convenience, strategic importance, customer demand, low perceived risk/security concerns and stakeholder partnerships. Findings suggest low levels of customer demand and lack of return on investment (ROI) are key barriers for banks. The findings have strategic implications for industry players highlighting the importance of mobile banking to maintain market share and customer relations. These influences will inform successful mobile banking strategies by raising awareness of major barriers.

Originality/value – This study concentrates on a bank/stakeholder perspective. It confirms that DOI theory is still applicable within mobile environments. It extends understanding of bank adoption providing useful information for all stakeholders. It has implications for banks regarding multi-channel banking and the motivators and challenges influencing its adoption.

Keywords Mobile banking, Blogging, Delphi method, Distribution channels, Diffusion of innovation

Paper type Research paper

Introduction

Technology innovations have been a major force driving changes within distribution in banking. It first began to alter banks distribution channels in the 1970s with the introduction of ATMs, followed by telephone banking in the 1980s, internet banking in the 1990s and mobile banking 1990s-2000s (Devlin, 1995; Hoehle *et al.*, 2012). For the purposes of this study mobile banking is defined as:

> An interaction in which a customer is connected to a bank via a mobile device, such as a mobile phone or personal digital assistant, (PDA) (Laukkanen and Kiviniemi, 2010, p. 373).

Due to the ubiquity of mobile phones, the increasing popularity of the mobile internet, advancement of mobile technology and increasing consumer demand for mobile services, mobile banking is an important service innovation, extending the current multi-channel strategy and requires further investigation (Laukkanen *et al.*, 2008; Pouttschi and Schurig, 2004). Currently, 0.8 billion individuals use mobile banking primarily driven by smartphone adoption. With an estimated future customer base of 1.8 billion by 2019, banks therefore cannot ignore mobile banking (Juniper Research, 2014). Moreover, mobile banking is presumed to evolve into an important future distribution channel within bank's multi-channel distribution strategy by providing potential competitive advantage (Tiwari *et al.*, 2007). In developing countries mobile banking even has the potential to become a primary distribution channel, impacting upon economic development and increasing financial inclusion (Agwu and Carter, 2014; Mutsune, 2015).

Understanding influences upon bank adoption is important since mobile banking has, to date, not fulfilled its promise (Bhatt, 2016). Despite the availability of technology and benefits for banks and customers mobile banking remains in the early phase of adoption, even where high mobile phone penetration exists (Moser, 2015).

International Journal of Bank Marketing
Vol. 35 No. 7, 2017
pp. 1154-1174

0265-2323
DOI 10.1108/IJBM-09-2015-0145

Based upon a review of the literature, a lack of stakeholder investigation and diffusion of innovation (DOI) studies is acknowledged. Coupled with the potential importance of mobile banking for banks, this study investigates "What are the factors influencing bank adoption of mobile banking?" This enquiry explores the drivers and barriers influencing bank adoption of mobile banking. It uses Rogers (1995) definition of adoption namely "the decision of any individual or organisation to make use of an innovation" (as cited in Frambach and Schillewert, 2002, p. 163).

The study makes several contributions. It extends DOI studies by focussing upon service industry organisations. Within DOI literature service innovations, particularly financial, are under researched (Storey *et al.*, 2015). Technology diffusion studies within a financial services context are acknowledged as a largely neglected area (Bofondi and Lotti, 2006). This study addresses this gap considering mobile banking as a service innovation and answers the call for more research in this area. The study also takes a global developed world perspective, which is a much neglected view, reflecting the importance, within developed economies, of drivers of new service development and their impact (Berger and Nakata, 2013). Moreover, DOI studies tend to follow an individual focus as opposed to an organisational perspective. Whilst mobile banking studies are rapidly increasing in volume they predominately explore a customer perspective (Laukkanen, 2016; Manoranjan *et al.*, 2016). This study therefore extends previous research by considering organisational diffusion of mobile banking (Bofondi and Lotti, 2006). It contributes by focussing upon banks as the literature needs to be updated regarding bank adoption of mobile banking. The importance of the current study is emphasised by the dearth of literature focussing upon mobile banking from a stakeholder perspective.

The adoption of mobile banking is linked to successful partnership formation with stakeholders. The need to explore and fully understand bank adoption from a stakeholder perspective building upon the collective knowledge of the convergent industries such as telecom and banking and other main stakeholders is therefore evident. Furthermore, previous bank studies tend to concentrate upon strategic perspectives of mobile banking (e.g. Scornavacca and Hoehle, 2007); this study takes an alternate view focussing upon the perceived attributes of mobile banking and bandwagon pressures as influences upon bank adoption. The perceived attributes of mobile banking have previously been explored from a consumer view point (Lee *et al.*, 2015). This study argues therefore that, due to the market potential for mobile banking to transform and redefine business models and influence on financial inclusion, banks can ill afford to ignore it and a greater understanding of the factors influencing bank adoption are needed (Singh *et al.*, 2010). Furthermore, whilst the majority of banks offer some form of mobile banking services the authors argue, due to sporadic global adoption, and the continuance of mobile banking to remain within the early adopter phase, there is a need to understand the influences upon bank adoption.

This paper is structured as follows. Potential drivers and barriers on bank adoption are identified. The methodology is then outlined followed by the findings. Thereafter, conclusions and practical implications are presented.

Mobile banking background

In an increasingly competitive environment, where customer loyalty is diminishing, mobile banking offers banks the potential to gain competitive advantage, retain and acquire customers. It also supports increased customer satisfaction through value-added mobile services, cross-selling and reduced costs (Shankar and Kumari, 2016; Tiwari *et al.*, 2006; Vinayagamoorthy and Sankar, 2012; Juniper Research, 2014). A key distinguishing feature of mobile banking, compared to other channel innovations, is the multiple access modes. Typically, access is through short messaging service (SMS), browser-based systems (WAP) and client applications or apps. According to Vinayagamoorthy and Sankar (2012), SMS and

browser are the most commonly used platforms. However, this opinion is not shared by the industry. BBA and EY (2015) reported that downloadable apps were the most popular platform for customers with an estimated 15,000 apps downloaded per day in the UK alone. Typically, many banks provide services from more than one platform enhancing functionality thereby meeting the needs of a wider group of customers (Pousttchi and Schurig, 2004). Currently, service offerings continue to differ worldwide (KPMG, 2014). No national, global or universal standard for mobile banking technology exists (Donner and Tellez, 2008) highlighting the limited evolution and development of this innovation to date.

Whilst the majority of banks offer some form of mobile banking service globally, adoption rates differ, even amongst countries with similar economic conditions (KPMG, 2014). Adoption rates are generally higher in developing as opposed to developed countries. For example, in China and India adoption rates are estimated at 60-70 per cent (KPMG, 2014). Attempts to explain such differences have been limited. For example, Barnes and Corbitt (2003) used a competitive framework to investigate mobile banking concluding that existing distribution channels, market conditions and perceptions were important (Scornavacca and Barnes, 2004; Scornavacca and Cairns, 2005). Moreover, they surmise that the return on investment (ROI) for banks may also have an impact. Differences in adoption may also be related to the level of competitiveness within markets, country wealth and the telecom markets (Riivari, 2005). Specifically relating to wireless technology, of which mobile banking is an example, Sundqvist *et al.* (2005) concluded that variables related to the country in terms of wealth, trade, cosmopolitanism, mobility, culture and timing may help explain international differences in the rate of diffusion. In general m-commerce, of which mobile banking is a key part, is following a different diffusion pattern than e-commerce (KPMG, 2014). Little consensus therefore exists on what the overall factors are influencing bank adoption of mobile banking.

DOI

An innovation is "an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (Rogers, 1995, p. 11). DOI investigates both current and future rates of adoption of innovations and demand (Kim and Huarng, 2011). It has been applied to the adoption of financial self-service distribution channels (Gerrard and Cunningham, 2003). Mobile banking is regarded as a service innovation enabling a multi-channel banking strategy by providing a new method for customer engagement. Financial innovations are considered important as the retail banking sector is a significant part of the overall economy and therefore needs to continually evolve to meet customers changing needs. Service innovations are however under researched within DOI literature with a bias towards the manufacturing industry (Laukkanen, 2016). Furthermore, DOI theory is based upon the assumption that the new innovations adopted are superior to, and replace, their predecessors – this is not the case with mobile services as these are normally complimentary to existing channel provision – making this theory potentially less relevant (Constantiou *et al.,* 2006).

Mobile banking diffusion studies are limited and tend to concentrate on the consumer adopter. Rogers (1995) model is frequently used to explore the characteristics of these adopters (Sulaiman *et al.*, 2007; Suoranta and Mattila, 2004). Studies have examined demographic differences between adopters/other online users (Laukkanen and Pasanen, 2008), drivers and barriers to customer use of mobile banking (Suoranta *et al.*, 2005) and attributes of mobile banking (Lin, 2011). Whilst the influence of the perceived attributes have been investigated from a consumer perspective (Dzogbenuku, 2013) bank adoption remains largely unexplored.

Organisational diffusion studies

Numerous models exist to explain adoption by identifying the positive and negative influencing factors (Abrahamson and Rosenkopf, 1993; Rogers, 1995). These tend to be

quantitative and concentrate on identifying innovative characteristics such as size and attitude towards change. Diffusion is thought to be accelerated by factors such as competitive advantage, cost reduction and defensive market strategies (Suoranta *et al.*, 2005). This study extends this view by also considering the attributes of mobile banking and the influence of bandwagon pressure upon adoption.

DOI theory stipulates that the perceived attributes of an innovation are key determinants influencing the rate of adoption (Rogers, 1995). Perceived attributes include relative advantage, compatibility, complexity, observability and trialability. While commonly applied to consumer studies the innovation attributes are also applicable to organisational studies. In this enquiry relative advantage of mobile banking refers to competitive advantage, brand development and evidence of ROI. Compatibility relates to existing bank systems, strategic objectives and customer convenience and demand, while complexity relates to the multiple modes of access. Observability refers to the number of other retail banks using mobile banking and trialability is defined as the level of awareness and opportunity to train staff before adoption (ease of trial). We postulate that a possible explanation for the continued slow rate of bank adoption may be that banks perceive relative advantage, observability, trialability and compatibility as low in the context of their existing systems and activities. Interestingly, Rogers (1995) identifies compatibility as a primary influence upon technology adoption by organisations (Carayannis and Turner, 2006). In fact, compatibility was previously identified as a barrier to bank adoption of internet banking (Thulani *et al.*, 2009). Additionally, the bandwagon theory (Abrahamson and Rosenkopf, 1993) considers that organisations are reactive and adapt due to the cumulative pressure (institutional or competitive) from those around them (Molyneux and Shamroukh, 1996). In fact, this theory, despite its obvious ability to explain adoption of innovation, remains largely underutilized. Furthermore, features unique to organisational studies include centralisation, complexity, networks and leadership characteristics (Lundblad, 2003). More recently, studies have considered the issue of financial inclusion (Donner and Tellez, 2008; Mutsune, 2015). In addition, other influences relate to reputation/organisational characteristics and technology standardisation (Nguyen *et al.*, 2003). Bank-specific characteristics have been found to influence bank adoption of past electronic channels such as internet banking (Hernández-Murillo *et al.*, 2010) and ATMs (Adewoye, 2013).

However, as a result of the number of failed Information Communication Technology (ICT) innovations including WAP-based mobile banking, it has been suggested that traditional DOI theory no longer fully explains contemporary ICT diffusion (De Marez and Verleye, 2004), particularly in the mobile environment (Yang, 2009). Therefore, it is assumed that, due to nuances of mobile banking, there may be specific mobile banking (ICT) related and non-ICT (seminal DOI theory) related factors influencing bank adoption. This provides further justification for the current study.

Bank adoption

To date literature has largely focussed on consumer behaviour favouring technology adoption theories such as the technology acceptance, theory of planned behaviour and unified theory of acceptance and use of technology. Indeed, research from a bank perspective has not been synthesised further highlighting the dominance of a customer perspective in the literature and how bank adoption remains under researched. Additionally, there exists a small number of technology studies which explore usability of platforms (Peevers *et al.*, 2008), security protocols (ElFgee and Arara, 2014), mobile applications (Pousttchi and Schurig, 2004) and navigation links (Hyvärinen *et al.*, 2005). Bank investigation using a stakeholder perspective is mainly limited to exploration of mobile banking business models, the strategic analysis of mobile banking or competition/collaboration between stakeholders (Barnes and Corbitt, 2003;

Tiwari *et al.*, 2006; Lee *et al.*, 2015). This study highlights the investigation of bank adoption from a stakeholder perspective is imperative.

Drivers of bank adoption

The key drivers for banks regarding any service innovation is normally cost and benefits (Barnes and Corbitt, 2003). Traditionally cost savings have driven decisions (Lu Stout, 2007) which has been the case regarding the adoption of previous electronic channels (Jayawardhena and Foley, 2000). However, cost considerations may also produce a decelerating effect upon the diffusion of mobile banking due to prohibitive start up and running costs and a reluctance to invest in new technologies (De Castro, 2009). Implementation costs were found as a barrier to banks adoption of internet banking (Thulani *et al.*, 2009) although Jones (2014) concluded that mobile banking may generate additional revenue. Furthermore, bank profitability was eroded by the adoption of internet banking due to increased competition (Onay and Ozsoz, 2013). Banks are also raising concerns as ROI is difficult to predict since many benefits of electronic channels are already provided through internet banking (Feig, 2008). In fact, ROI was not immediate for internet banking, taking between one and three years to realise (Hernando and Nieto, 2007). Banks are also motivated by the convenience and flexibility offered to customers and the ability to cross-sell (Herzberg, 2003) although this is widely debated (Parvin, 2013; Scornavacca and Hoehle, 2007). Scornavacca and Barnes (2004) concluded that banks took the opportunity to cross-sell their products over the mobile channel. Tiwari *et al.* (2007) identified that the strategic driver of German banks was to strengthen the bank-customer relationship, while Parvin (2013) concluded that adoption is driven by increased customer satisfaction, competitive pressures and financial inculsion (Jones, 2014). There are therefore numerous influences and issues referred to with limited consensus drawn.

Furthermore, banks were thought to introduce new channels as a defensive strategy due to the threat posed by non-banks, reflecting the past adoption of internet banking (Mallat *et al.*, 2004). Interestingly, Barnes (2003) proposes that "no single industry" can establish the m-commerce environment rather "co-operation, collaboration and consolidation" is required from convergent industries (Barnes, 2003, p. 92). Barnes (2003) attributed adoption to stakeholder partnerships although Oh *et al.* (2005) suggest that any partnerships formed may be temporary as technology continues to develop and competition increases. Tiwari *et al.* (2007) identify the potential for, or enhancement of, competitive advantage and brand image as key drivers. It is therefore concluded that numerous drivers of adoption of mobile banking are proposed although there appears limited agreement among researchers to date.

Specific to m-commerce, the evolution of smartphones (Faqih and Jaradat, 2015), demographic developments and the demand for mobility of services (Tiwari *et al.*, 2006) are key drivers. Regulation is also considered to be a key influence thereby increasing security for customers (Lau, 2003). Interestingly, the rate of m-commerce diffusion differs between developing and developed countries. Cultural, security, social, political, economic and technological factors are thought to play important roles in further compounding national differences (Faqih and Jaradat, 2015). Furthermore, mobile markets differ between countries due to value chain dynamics, technology and government regulation (Sgriccia *et al.*, 2007).

Furthermore, Weber and Kauffman (2011) reviewed global ICT adoption literature concluding economic and social influences as impacting diffusion. Economic influences include revenue, cost, risk, wealth, trade, competition and firm performance. Social factors relate to technology and education levels, whilst other factors are concerned with legal, environmental (family, religion) and cognitive (innovativeness of society) issues. Economic and social factors are used to inform the drivers and barriers explored in this study. Despite providing interesting insight it is still unknown how well these ICT-related variables explain mobile banking diffusion.

Barriers

Many barriers have been identified although under researched in comparison to drivers. Two initial factors are the lack of influence or drive from the market and government restrictions (Barati and Mohammadi, 2009). Other factors include low customer demand, lack of stakeholder partnerships and expenditure reduction due to the recession (De Castro, 2009). Banks themselves are hindering adoption by targeting mainly online customers, who represent less than 50 per cent of their overall customer base, thereby limiting the growth potential for mobile banking (De Castro, 2009). Tiwari *et al.* (2006) suggested the insignificance of mobile banking to customers, costs, unsuitability of mobilising bank products, compatibility to existing IT infrastructure, security concerns, shortage of staff skills, management interest and conflict with existing distribution channels as additional inhibitors. These authors conclude that, due to the cumulative strength of these barriers, they would not deter banks due to the power of mobile banking as a means of differentiation and competitive advantage. The authors would therefore expect mobile banking to follow internet banking and become a standard service offering. Further investigation, therefore, of the factors influencing the adoption of mobile banking are needed to develop this understanding. The authors acknowledge that there are variances in the adoption rate of mobile banking globally and this paper attempts to better explain this adoption landscape.

Methodology

Research approach and data collection

Data were collected in three sequential stages using two different methods – blogging and Delphi. The Delphi was the main data collection tool. Delphi is widely acknowledged as an established research technique, applied in multiple disciplines. Delphi studies consider what may be possible, probable and/or preferable within the medium or long term in a variety of research areas (Patokorpi and Ahvenainen, 2009; Tapio and Hietanen, 2002). Samples were generated using non-probability techniques.

In order to raise awareness of the study, identify potential participants for the Delphi study and to inform the participants about the Delphi questionnaire, following a pilot and subsequent amendments, a dedicated mobile banking blog was live for three months. The blog contained a research synopsis and study details. Two open-ended questions were posted reflecting the main study aims. This method was deemed suitable, as blogging is well established in both industry and academia. It has emerged as a viable qualitative data collection tool which is cost effective and easy to use (Balagué and De Valck, 2013). The first sample, which was geographically dispersed, was generated through social network sites (LinkedIn and Facebook). These self-selecting bloggers, from financial services, were predominately male (81 per cent), originating from Asia (40 per cent), North America (20 per cent), Europe (14 per cent) and the Middle East (14 per cent). Whilst the sample was statistically small ($n = 25$), the data produced were rich and informative. Furthermore, this stage was used to purely inform the main Delphi study, in addition to the literature, and therefore the objective was data quality and not quantity.

Subsequently, this study used a modified Delphi as the main method, which is an efficient, flexible and well-established forecasting methodology (Sawford *et al.*, 2014). Modified Delphi involves a structured communication process, where a questionnaire is administered to a predetermined panel of experts in a number of "rounds", between which feedback is provided, in order to achieve stability/consensus of opinion (Powell, 2003). Delphi is suitable for studying complex phenomenon, such as mobile banking, where uncertainty exists, technologies are at an early stage of diffusion and expert opinion exists (Bradley and Stewart, 2003). Delphi has previously been applied to DOI studies within the banking industry (Prendergast and Marr, 1994; Bradley and Stewart, 2003).

The authors conclude that Delphi has not been applied to investigate mobile banking to date, although it has been used within m-commerce studies (Kuo and Chen, 2008).

The success of any Delphi study depends on the expert panel composition (Donohoe and Needham, 2009). Similar to criteria used in prior studies (Prendergast and Marr, 1994), an expert is objectively described as a person in a management position within their organisation (>3 years) with knowledge or experience of mobile banking/commerce. Purposeful and snowball sampling were therefore used including self-selecting participants from the blog. This approach is fit for purpose as participants were chosen due to their knowledge and expertise (Choi and Sirakaya, 2006). Six stakeholder groups (72 participants) representing a 72 per cent response rate (100 invites issued) participated in the Delphi from February to June 2011 (see Table I). Senjali *et al.* (2014) had similar sample sizes in their study (Round 1-61 participants and Round 2-46 participants). The aim was to have varied representation from stakeholder industries and geographic locations, not equal numbers in each group, with the focus on panel members' cumulative knowledge and experience of mobile banking. The stakeholders were identified from prior literature and included academics/practitioners (relevant researchers), mobile banking solutions providers (technology platforms providers), mobile payment facilitators (providers of future innovation in the industry and next step in mobile banking), banks (suppliers of mobile banking), telecommunications (providers of the enabling infrastructure) and "others" with knowledge of mobile banking and/or the technology. The main stakeholders are acknowledged to come from the converging industries, namely, banking and telecommunication.

The majority of panel members were based within developed countries (60 per cent) employed within their organisation for at least four years (75.3 per cent) and in a management position or above (62 per cent). The panel therefore concluded as sufficiently experienced based on the employment duration/experience and managerial positions held to meaningfully contribute to the study.

Panel members were contacted via e-mail. Similar questionnaires were used in Rounds 1 and 2 with a choice of e-mail or online completion. Section A investigated distribution channel strategy, services available and technology platforms, while Section B focussed upon trends in mobile banking. Section C gathered demographic data. A five-point Likert scale was applied to the rating questions and panel members were required to indicate their level of confidence in their responses for each round. Data from each round were analysed and fed back along with individual responses for review. Statistical feedback comprised of the modal panel opinion. Consistent with previous studies, this Delphi study sought to discover stability, as opposed to consensus, of opinion, which was identified by the Wilcoxon signed-rank test (Crisp *et al.*, 1997). Significant z values ($p < 0.05$) represent instability in which case the frequency of changed opinion is also presented. Further, cross-group analysis was conducted using the Kruskal-Wallis test to identify differences in

Table I. Stakeholder industry participation in the Delphi rounds

Stakeholder	Round 1	Round 2	Round 3
Academic/practitioner	2	2	2
Mobile banking solution/provider	9	8	9
Mobile payment facilitators	8	3	6
Retail bank	25	12	17
Telecommunications	10	3	6
Researcher/practitioner	4	2	2
Other (NFC/core banking)	14	4	7
Panel size	72	34	49
Response rate (%)	69	69	68

importance levels of variables across stakeholder industries. Significant χ^2 values ($p < 0.05$) indicates differences in importance levels exist between the stakeholder industries.

The Delphi was completed after two rounds, as stability of panel opinion was established, and further rounds may have exacerbated attrition rates.

Findings and discussion

Data were analysed using SPSS v 22 and thematic content analysis. Themes were identified where consensus of opinion was achieved. Divergent opinions were also of interest.

The findings from the blog identified the potential to differentiate from competitors as a driver along with customer acceptance and security. Increased adoption among banks was seen to be driven by technology enabling enhanced security. These issues, combined with the literature, informed the subsequent Delphi questionnaire.

Barriers and drivers

Panel members were presented with a predetermined list of motivating and inhibiting variables informed by literature and the blog. The relative importance of each variable was rated on a five-point Likert scale ranging from very important (1) to no importance (5). Variables identified as "very important" are considered key influences upon bank adoption. The findings presented are from the main methodological stage – the Delphi study. The aggregate conclusions of the panel are represented by the median, which is further analysed by stakeholder groups.

Non-responses were noted relating only to the drivers in both rounds mainly by mobile banking solution provider panel members and were deemed insignificant with no influence on overall opinion. This may have arisen due these providers being reticent to acknowledge drivers or assuming that these are already explicitly understood.

Drivers

Inspection of the mean showed that panel members considered key drivers as the global penetration of mobile phones, competitive advantage, customer convenience, strategic objective of the bank, customer demand, low perceived risk/security concerns and the formation of stakeholder partnerships. Identification of mobile phones as a key influence is an acknowledged feature of m-commerce (Faqih and Jaradat, 2015).

Interestingly, divergent opinion was most common among the mobile banking solution providers, mobile telecommunication and banking industries, possibly due to these main stakeholders having their own interests and objectives to pursue. Opinion was stable for all drivers between rounds as the results of the Wilcoxon signed-rank test are insignificant. Results of the Kruskal-Wallis test are statistically insignificant confirming that the stakeholders' opinion was similar regarding the importance of driver variables. Regarding demand panel member (PM3), from the telecommunications industry, observed "There is little demand for mobile banking yet banks are gearing up to meet anticipated demand". The importance of partnerships was widely discussed. For example, PM21, a mobile banking solution provider, stated "Developing interactive partnerships is the key to expanding availability".

ROI was argued by PM2, banking industry member, among others as having a significant influence on adoption: "Evidence ROI: I still believe it is very important. Product managers of banks question the business case of mobile banking, preventing banks from actually working on a new mobile bank product". This perspective is consistent with Jones (2014).

Further quantitative analysis was carried out to investigate potential relationships. A Spearman's rank correlation coefficient investigated correlations between drivers (see Table II).

Table II.
Correlation matrix for drivers

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Current economic conditions	–														
Number of other retail banks adopting	0.296*	–													
Communication and influence from others	0.252*	0.330**	–												
Competitive advantage	0.145	0.049	0.238*	–											
Strategic objective/plan of retail bank	0.085	−0.079	0.002	0.336**	–										
Existing bank distribution infrastructure	0.063	0.065	−0.034	0.240*	0.542**	–									
Brand development of retail banks	0.063	0.056	0.155	0.291*	0.241*	0.385**	–								
Ease of trail by retail banks	0.173	0.053	0.202	0.248*	0.316**	0.436**	0.425**	–							
Customer-driven demand	0.185	0.221	0.039	0.161	0.053	0.286*	0.232	0.297*	–						
Consumer convenience	0.092	0.045	0.091	0.240*	0.144	0.401**	0.221	0.418**	0.524**	–					
Evidence of return on investment	0.231	0.155	0.057	0.096	0.132	0.217	0.230	0.266*	0.341**	0.357**	–				
Low risk and security concerns	0.235*	0.396**	−0.004	0.121	0.162	0.295*	0.221	0.218	0.314**	0.354**	0.465**	–			
Global penetration of mobile phones	0.082	0.135	0.122	0.208	0.093	0.188	0.144	0.079	0.017	0.246*	0.139	0.210	–		
Compatibility of existing bank system	0.242*	0.202	0.071	0.098	0.321**	0.400**	0.153	0.367**	0.167	0.263*	0.347**	0.198	−0.001	–	
Formation of partnerships with others	0.286*	0.217	0.331**	0.339**	0.187	0.166	0.225	0.128	0.045	0.066	0.188	0.260*	0.385**	0.264*	–

Notes: *,**Correlation is significant at the 0.05 and 0.01 level (two-tailed), respectively

Customer convenience (relative advantage) was reported as having a moderately positive correlation with evidence of ROI ($\rho = 0.357$; $p < 0.01$) and low perceived risk ($\rho = 0.354$; $p < 0.01$). For banks the higher the relative advantage of mobile banking, namely, convenience provided to customers, the higher the perceived ROI. It may be assumed that banks see convenience as enabling satisfied customers and ROI results from enhanced engagement with improved customer satisfaction and not necessarily just in financial terms. A slightly weaker positive correlation was identified with global penetration of mobile phones ($\rho = 0.246$; $p < 0.05$) and compatibility with existing bank systems ($\rho = 0.263$; $p < 0.05$). This may be due to mobile banking platforms being easily incorporated within internet banking, thereby enabling extension of internet services to the mobile platform. This is however a narrow perspective and may restrict potential market growth based on arguments by De Castro (2009). The convenience (relative advantage) for customers in driving adoption is logically related to high global penetration of mobile phones. The compatibility of mobile banking with existing bank systems showed a moderately positive relationship with the formation of stakeholder partnerships ($\rho = 0.385$; $p < 0.01$). This infers that compatibility may be an important bank consideration when deciding whether to embark upon a partnership with another stakeholder. It is likely that partnership formation may aid development of existing systems, which may include engagement with mobile banking solution providers or telecommunication companies, enabling banks to take advantage of their developed infrastructure.

Ease of trial by banks was shown to have a moderately strong positive relationship with consumer convenience ($\rho = 0.418$; $p < 0.01$), customer-driven demand ($\rho = 0.297$ $p < 0.01$) and existing bank systems ($\rho = 0.367$; $p < 0.01$). The ease of trial is enabled, if banks are providing mobile banking, to facilitate customer convenience in response to customer demand although ensuring it is compatible with existing bank systems is a priority. It is likely that banks may have to modify existing systems to provide mobile banking to enable customer convenience, leading to increased customer demand, thereby encouraging further industry adoption. The customer demand driver was reported to have a moderately positive relationship with consumer convenience ($\rho = 0.524$; $p < 0.01$), evidence of ROI ($\rho = 0.341$; $p < 0.01$) and risk/security concerns ($\rho = 0.314$; $p < 0.01$). For banks meeting customer demand with mobile banking this is a logical development. Banks are happy to provide the channel as with demand comes ROI (both financial reward and satisfied customers), thereby reducing the perceived risk associated with this service innovation.

The number of other retail banks adopting had a moderately positive relationship with communication and influence from other industry members ($\rho = 0.330$; $p < 0.01$) and low perceived risk/security concerns ($\rho = 0.396$; $p < 0.01$). This shows that bandwagon effects exist (Abrahamson and Rosenkopf, 1993). Competitive pressures drive banks making security risks appear less significant. Banks feel they must respond and therefore become less wary of associated risks. Communication and influence from other industry members was reported as having a moderately positive relationship with stakeholder partnership formation ($\rho = 0.331$; $p < 0.01$) but a weaker positive relationship with competitive advantage ($\rho = 0.238$; $p < 0.05$). Increased communication and influence within the industry is more likely to increase importance of forming partnerships to gain a competitive advantage – "acquire expertise to compete". Competitive advantage however becomes less achievable when banks pressure each other to adopt, if the majority of banks have already adopted, which is a typical characteristic of a widely diffused innovation. These findings suggest that seminal diffusion models are still applicable to mobile banking, although they only partially explain bank adoption (Abrahamson and Rosenkopf, 1993; Rogers, 1995). This is a complex innovation with specific characteristics/influences therefore it is unsurprising that, due to the nuances of mobile banking, new innovation-specific drivers and barriers, or a combination of these, have emerged with varied influence.

Drivers specific to mobile banking such as mobile devices and partnership formation, combined with existing theories and models, need therefore to be considered together to accurately explain bank adoption of mobile banking.

Barriers to mobile banking adoption

Low levels of customer demand and lack of evidence of ROI are key barriers to bank adoption of mobile banking. Stability of opinion was concluced based on insignificant Wilcoxon signed-rank test results.

In both rounds, the highest level of comments focussed on low levels of demand. For example, PM3, a mobile solution provider, stated "demand is low due to low awareness amongst customers. At present there is little demand from customers. Many wouldn't even know what it is". Lack of evidence of ROI was summed up by PM37 – "it is not a technological issue, it is a business one" – return is the only business case. Other barriers were identified as "of some" importance. Statistically no difference in importance levels was concluded across stakholder industries based on by the insignificant results of the Kruskal-Wallis test. PM3, a mobile banking solution provider, made an observation regarding security that "All e-channels have their own security concerns. Customers will always be very happy or cautious". Security was previously identified as a barrier in earlier studies (Faqih and Jaradat, 2015). This explains why customer demand for technology-based innovations is likely to be slow in reaching mass adoption and banks therefore have a role to play in stimulating and influencing this. Furthermore, and consistent with De Castro (2009), banks are focussed upon expenditure reduction in the current economic climate thereby delaying decisions on adoption further.

The findings on barriers to bank adoption support seminal diffusion studies regarding the relative advantage of mobile banking. The convenience of other competing channels is a significant barrier to bank adoption, similar to Tiwari *et al.* (2006), who argue mobile banking is in competition with other channels. As an additional distribution channel mobile banking benefits may already be offered through existing channels which stalls/hinders any new approaches/innovations. The incompability of mobile banking with existing bank systems is consistent with existing understanding of adoption deterence (Frambach and Schillewert, 2002; Rogers, 1995). Risk and uncertainty were previously identified as barriers to innovation adoption. As regards bandwagon effects, communication and influence from the industry and the the number of other banks adopting were identified as barriers. The research therefore concludes two barriers specific to bank adoption namely the reach of existing bank infastructure and absence of partnerships.

The importance of barriers to bank adoption was summarised by PM42 (telecommunication industry), who commented that mobile banking was at an "infant stage in the world economy". This is an interesting comment since, 13 years ago, mobile banking was first identified to be at the infant/early stage of global adoption (Barnes, 2003) – we therefore assume there has been little significant advancement in bank adoption since the original inception. This further confirms the importance of investigating influencing factors upon the adoption rate.

A Spearman's rank correlation coefficient was carried out to investigate possible correlations between the barriers and several significant relationships were identified (Table III).

The relative advantage of other distribution channels (Rogers, 1995), possibly convenience, provided through other remote channels, has a moderately positive correlation with lack of evidence of ROI ($\rho = 0.383$; $p < 0.01$). It is likely the benefits of other channels raises concern over the likelihood of generating ROI thereby preventing banks from embracing mobile banking – confirming a conflict with other channels (Tiwari *et al.*, 2007). Low levels of customer demand had a strong positive relationship with the convenience provided through

	1	2	3	4	5	6	7	8	9	10	11	12
Current economic conditions	–											
Number of other retail banks adopting	0.396**	–										
Communication and influence from others	0.390**	0.692**	–									
No competitive advantage	0.257*	0.332**	0.371**	–								
Not part of strategic objective/plan of bank	0.159	0.126	0.159	0.451**	–							
Incompatibility with existing bank systems	−0.066	0.085	0.132	0.358**	0.291*	–						
Existing bank distribution infrastructure	0.139	0.375**	0.347**	0.402**	0.376**	0.366**	–					
Low level of customer demand	0.234*	0.254*	0.325**	0.285*	0.065	0.088	0.475**	–				
Convenience provided through other channels	0.136	0.227	0.202	0.127	0.083	0.002	0.334**	0.517**	–			
Lack of evidence of return on investment	0.127	0.079	0.159	0.122	0.111	0.226	0.261*	0.319**	0.382**	–		
Absence of partnerships formed with others	0.234*	0.380**	0.431**	0.372**	0.179	0.210	0.182	0.071	0.129	0.415**	–	
Perceived risk and security concerns	0.322**	0.164	0.258*	0.191	0.001	0.033	−0.031	0.137	0.174	0.414**	0.595**	–

Notes: *,**Correlation is significant at the 0.05 and 0.01 level (two-tailed), respectively

Table III.
Correlation matrix for barriers

other channels ($\rho = 0.517$; $p < 0.01$). For banks the relative advantage of mobile banking, in comparison to other channels, may impact upon customer demand; low customer demand continues to inhibit diffusion since customers may be conveniently banking 24/7, (Suoranta and Mattila, 2004), for example, through internet banking. Moreover, low levels of customer demand were reported to have a moderately positive relationship with lack of evidence of ROI ($\rho = 0.319$; $p < 0.01$). Continued low demand lowers the perceived investment return and profitability of mobile banking which further discourages industry adoption. Low customer demand was, in fact, responsible for banks earlier withdrawal of mobile banking services (McCartney, 2002; Scornavacca and Hoehle, 2007). The number of other retail banks adopting was concluded as having a strong positive correlation with communication and influence from other industry members ($\rho = 0.692$; $p < 0.01$). In fact, the absence of competitive bandwagon pressures means banks are less likely to engage with mobile banking (Abrahamson and Rosenkopf, 1993). Low levels of industry adoption may further deter bank adoption, since there is an absence of any competitive pressure to encourage banks to engage in what would appear to be a little understood innovation such as mobile banking. The number of other retail banks adopting also shared a moderately strong positive correlation with no competitive advantage ($\rho = 0.332$; $p < 0.01$), existing bank infrastructure ($\rho = 0.375$; $p < 0.01$) and absence of stakeholder partnerships ($\rho = 0.380$; $p < 0.01$) along with a weaker positive correlation with low levels of customer demand ($\rho = 0.254$; $p < 0.05$). This may be due to the competitive advantage having already been gained by the early bank adopters, eroding any potential future competitive gain and, coupled with low customer demand, low levels of industry adoption results due to perceived no/limited competitive benefit. Interestingly, if the reach of the existing bank infrastructure is considered sufficient banks perceive their distribution to be at an optimum configuration for customers and, coupled with the limited industry competitive pressure, there is little drive to engage in the adoption of this innovation. Regarding the relationship between the number of banks adopting and partnership formation, it is likely that the absence of partnerships makes banks more cautious and reluctant to provide mobile banking due to perceived limited in-house expertise. This finding is consistent with Tiwari *et al.* (2006) who identified lack of internal expertise as a key barrier.

The lack of a competitive advantage from mobile banking had a moderately positive correlation with lack of strategic objective in the bank ($\rho = 0.451$; $p < 0.05$), incompatibility with existing bank systems ($\rho = 0.358$; $p < 0.05$), existing bank infrastructure ($\rho = 0.402$; $p < 0.05$) and absence of partnerships ($\rho = 0.372$; $p < 0.05$). It is likely therefore that the competitive advantage from mobile banking needs to be recognised in order to form part of the strategic objective of banks and, not as Tiwari *et al.* (2006) concluded, to solely strengthen bank-customer relationships. Therefore, the lack of perceived competitive benefits of mobile banking may have led to banks not considering this as a long-term strategic objective. Banks may be less likely to adopt without partnerships to benefit from such as a telecommunications network, since it is acknowledged that there is a lack of in-house expertise and existing infrastructures are restrictive, therefore the need for partnerships to advance mobile banking is evident. For banks, potential competitive advantage is more likely to drive the formation of these partnerships.

Triangulation of source, data type and multi-methods served to increase the validity of the findings. Validity was strengthened by panel members rating their confidence level from very unconfident (1) to very confident (5). The rating of confidence in responses by panel members is a feature of earlier Delphi studies (Bradley and Stewart, 2003). High confidence levels were found in Round 1 (97.3 per cent either confident or very confident) and Round 2 (95 per cent). The most confident stakeholders were the mobile telecommunications members (66.7 per cent very confident in Rounds 1 and 2). The driver and barrier variable scales also have good internal consistency with a Cronbach's α coefficient of 0.82 and 0.72, respectively, further supporting reliability and validity.

Conclusion

This study explored the drivers and barriers of bank adoption of mobile banking. Table IV shows the conceptual framework of the drivers and barriers of bank adoption of mobile banking clearly showing that relative advantage of mobile banking acts more as a barrier than a driver. Moreover, there are more barriers than drivers identified indicating that more negative influences have to be overcome by banks in order to ensure mass industry adoption. Practically, this information may be useful in helping banks develop and implement their mobile banking strategies. Finally, this framework shows how complex the area of adoption of mobile banking is and, could help to further explain, why its widespread global adoption has been sporadic and, at times, slow.

Practical and theoretical contributions

This enquiry makes several contributions to two under researched areas from the bank and stakeholder perspective. It contributes to the body of knowledge relating to organisational adoption of financial services and to DOI research on service innovations. The results indicate that seminal organisational diffusion models are still relevant within mobile environments to help understand the diffusion pattern of mobile banking (Abrahamson and Rosenkopf, 1993; Rogers, 1995). Some, but not all, variables were considered relevant in explaining the adoption of mobile banking. Compatibility with customer needs (convenience) and with strategic objectives of the bank was concluded as key drivers of bank adoption. This research suggests that traditional DOI theory does not fully explain the adoption of mobile banking but provides some insight and relevance. We conclude that these models are still partially relevant/applicable in a mobile environment which conflicts with De Marez and Verleye (2004). In fact, this study would disagree with Suoranta *et al.* (2005) and Yang (2009) who discuss the irrelevance of Roger's (1995) model in explaining adoption of modern innovations.

Evidence is presented here in relation to both the positive and negative influences of relative advantage (customer convenience), compatibility with existing bank systems,

Drivers	Barriers
Relative advantage	
Competitive advantage	No competitive advantage
	Lack of evidence of ROI
Compatibility	
Strategic plan/objective of bank	Not part of strategic plan/objective of bank
Compatibility of existing system	Compatibility of existing system
Customer demand	Low level of customer demand
Customer convenience	Convenience provided through other channels
Observability	
Number of other retail banks adopting	Number of other retail banks adopting
Communication and influence from others	Communication and influence from others
Environmental	
Current economic conditions	Current economic conditions
Partnership formation	Absence of partnership formation
Organisational	
Reach of existing bank infrastructure	Reach of existing bank infrastructure
Technology	
Perceived risk/security	Perceived risk/security

Table IV. Conceptual framework of bank adoption of mobile banking

ease of trial by banks (both in-house for the banks and for consumers) and competitive bandwagon pressures. We posit that consideration needs to be given, not only to the specific features (attributes) of mobile banking (relative advantage, compatibility and trialability), but also to its enabling environment (formation of partnerships, competition and demand uncertainty) in order to have a full understanding of mobile banking adoption. In fact, it may be that, due to the unique characteristics and nuances of mobile banking, similar to ICT innovations generic DOI models are no longer fully relevant in explaining adoption with innovation-specific models likely to emerge from additional research endeavours.

Furthermore, the study extends current understanding of bank adoption of mobile banking by contributing to bank studies from a bank and a stakeholder perspective. Accordingly, this study extends and updates previous knowledge regarding bank adoption of mobile banking. We can conclude that non-banks also have an invaluable contribution to make in the adoption and development of mobile banking. The existing reach of bank infrastructure is a barrier suggesting a reluctance on the part of banks to expand their presence through enhancing distribution – maintaining a "status quo" appears as the norm in the industry. This also relates to the lack of partnerships. Culturally, banks have traditionally not engaged with "non-banks", therefore the development of these corporate relationships may take considerable time to accept as necessary by the industry and, second, to create and form.

Key drivers relate to the global penetration of mobile phones, competitive bandwagon pressures, risk, partnership formation between stakeholder and consumer convenience. The identification of mobile phone availability as a key driver is a positive sign of potential future growth for mobile banking due to the ubiquity of mobile phones. This may infer that banks are adopting a customer-orientated approach to increase customer convenience through mobile banking. Low levels of customer demand and lack of evidence of ROI were also identified as key barriers.

The findings agree with the study of Barnes (2003) who identified that bank adoption of mobile banking is dependent upon existing channels, market conditions and consumer perception. Moreover, the findings corroborate Oh *et al.*'s (2005) view that the formation of partnerships between mobile carriers and banks aids industry diffusion. This supports the study of Barnes and Corbitt (2003) who suggest that partnerships between stakeholders are necessary. Furthermore, findings confirm the strategic importance of the cost/benefit argument when banks are deciding whether or not to adopt mobile banking (Barnes and Corbitt, 2003).

Most interesting was the issue of security, traditionally identified as a decelerating force upon adoption. Our findings indicate that security will become less of an issue as technology continues to advance. The results therefore provide a better understanding of the factors to be overcome/considered in order to increase the global rate of bank adoption of mobile banking. Interestingly, relationships between multiple barrier variables were identified than motivators. It is presumed that this may, in fact, suggest that barriers to adoption may be more complex and inter-related and therefore more difficult to fully understand and navigate/overcome by banks.

In conclusion banks need to offer mobile banking to compete and provide enhanced customer value – mobiles are the device of choice among many consumers and will drive industry adoption by creating further "demand pull". The risk associated with mobile banking adoption will be reduced as consumer acceptance and demand increases. Clearly, mobile banking is therefore important for banks in order to develop, and maintain, market share/customer relationships. Management must therefore adopt a proactive marketing strategy to actively raise the awareness of mobile banking and encourage consumer adoption. These recommendations will prove important for banks to make well-informed strategic mobile banking decisions and should feed into developing the business case for

investing in mobile banking, thereby encouraging management buy in and support. Banks should choose their partnerships with care as these are highly influential, and potentially the deciding factor, on successful bank adoption. This may require a review of internal bank culture to embrace this fully. Banks are not inclined to create partnerships, only by exception, with, for example RBS and Tesco and Bank of Ireland and the Post Office. The suggested partnerships will require an even greater step change in relation to developing a culture of corporate partnerships, strategic alliances, modifying business processes and embracing change. The industry should be aware that there are opportunities in relation to business expansion through the potential to tap into the customer bases of partners. Furthermore, this research presents practical implications for non-bank stakeholders, such as mobile banking solution providers, to inform their marketing message to better engage banks in mobile banking provision and further supporting partnership formation.

The inclusion of multiple stakeholders was deemed necessary to provide a holistic understanding of the mobile banking landscape. Interestingly the results indicate that the opinion of stakeholder industries is broadly similar with no statistical differences in importance levels identified. Despite this the limitations of the research are acknowledged. Only a supply position was considered thus assuming that mobile banking provision is bank-led. The researchers acknowledge that other business models were therefore ignored such as telecom-bank models. In terms of sampling the study is not without potential bias. The sample was not evenly distributed between the stakeholder groups nor between developed and developing regions. Statistically the sample was relatively small ($n = 72$) although considered large in the context of Delphi studies. Due to small sample size (72), violation of parametric assumptions and the nature of the data collected (nominal and ordinal), data analysis was restricted to non-parametric tests. A larger sample would have enabled factor analysis and may have identified additional relationships. As the qualitative data were analysed manually, using thematic content analysis with only one researcher, the possibility of researcher bias must be acknowledged. Moreover, cultural differences may influence findings and provide an additional source of bias – whilst the panel was globally dispersed – the division was not even. These limitations provide opportunity for future studies' developments. Despite the limitations the outcomes and findings of the research are testament to its success with valuable academic and practical implications highlighted.

Future researchers may wish to consider undertaking a study that includes a demand (customer) and supply (industry) perspectives. Indeed, they may wish to investigate how diffusion is likely to progress in the future and further explore the continued relevance and applicability of DOI models. Future researchers are encouraged to replicate the current study to identify how barriers and drivers have evolved and changed as the author(s) recognise these will change as mobile banking matures and develops over time. Researchers are encouraged to investigate differences between drivers/barriers of bank adoption using a developed and developing country lens. Moreover, exploration of variances in global adoption rates and cultural differences would provide a valuable dimension.

References

Abrahamson, E. and Rosenkopf, L. (1993), "Institutional and competitive bandwagons: using mathematical modelling as a tool to explore innovation diffusion", *Academy of Management*, Vol. 18 No. 3, pp. 487-518.

Adewoye, J.O. (2013), "Impact of mobile banking on service delivery in the Nigerian commercial banks", *International Review of Management and Business Research*, Vol. 2 No. 2, pp. 333-344.

Agwu, M.E. and Carter, A.L. (2014), "Mobile phone banking in Nigeria: benefits, problems and prospects", *International Journal of Business Commerce*, Vol. 3 No. 6, pp. 50-70.

Balagué, C. and De Valck, K. (2013), "Using blogs to solicit consumer feedback: the role of directive questioning versus no questioning", *Journal of Interactive Marketing*, Vol. 27 No. 1, pp. 62-73.

Barnes, S.J. (2003), "Pocket money: banking on mobile devices", *International Journal of e-Business Strategy Management*, Vol. 4 No. 4, pp. 265-275.

Barnes, S.J. and Corbitt, B. (2003), "Mobile banking: concept and potential", *International Journal of Mobile Communications*, Vol. 1 No. 3, pp. 273-288.

Barati, S. and Mohammadi, S. (2009), "An efficient model to improve customer acceptance of mobile banking", paper presented at the Proceedings of the World Congress on Engineering, London, 1-3 July, available at: www.iaeng.org/publication/WCECS2009/WCES2009_pp759-763.pdf (accessed 10 November 2010).

BBA and EY (2015), "The way we bank now: world of change", available at: www.ey.com/Publication/vwLUAssets/EY-The-way-we-bank-now-A-world-of-change/$FILE/EY-and-BBA-The-way-webank-now-A-world-of-change.pdf (accessed 16 January 2016).

Berger, E. and Nakata, C. (2013), "Implementing technologies for financial service innovations in base of the pyramid markets", *Journal of Product Innovation Management*, Vol. 30 No. 6, pp. 1199-1211.

Bhatt, A. (2016), "Factors affecting customer's adoption of mobile banking services", *Journal of Internet Banking and Commerce*, Vol. 21 No. 1, pp. 1-22.

Bofondi, M. and Lotti, F. (2006), "Innovation in the retail banking industry: the diffusion of credit scoring", *Review of Industrial Organization*, Vol. 28 No. 4, pp. 343-358.

Bradley, L. and Stewart, K. (2003), "A Delphi study of the drivers and inhibitors of internet banking", *International Journal of Bank Marketing*, Vol. 20 No. 6, pp. 250-260.

Carayannis, E.G. and Turner, E. (2006), "Innovation diffusion and technology acceptance: the case of PKI technology", *Technovation*, Vol. 26 No. 7, pp. 847-855.

Choi, H.C. and Sirakaya, E. (2006), "Sustainability indicators for managing community tourism", *Tourism Management*, Vol. 27 No. 6, pp. 1274-1289.

Constantiou, I., Damsgaard, J. and Knutsen, L. (2006), "Exploring perceptions and use of mobile services: user differences in an advancing market", *International Journal of Mobile Communications*, Vol. 4 No. 3, pp. 231-247.

Crisp, J., Duffield, D., Adams, B. and Nagy, S. (1997), "The Delphi method?", *Nursing Research*, Vol. 46 No. 2, pp. 116-118.

De Castro, M. (2009), "Mobile takes a breather", *American Banker*, Vol. 174 No. 197, pp. 18-19.

De Marez, L. and Verleye, G. (2004), "Innovation diffusion: the need for more accurate consumer insight of the PSAP sale as a segmentation instrument", *Journal of Targeting, Measurement and Analysis for Marketing*, Vol. 13 No. 1, pp. 32-49.

Devlin, J.F. (1995), "Technology and innovation in retail banking distribution", *International Journal of Bank Marketing*, Vol. 13 No. 4, pp. 19-25.

Donner, J. and Tellez, C. (2008), "Mobile banking and economic development: linking adoption, impact and use", *Asian Journal of Communication*, Vol. 18 No. 4, pp. 318-332.

Donohoe, H.M. and Needham, R.D. (2009), "Moving best practice forward: Delphi characteristics, advantages, potential problems and solutions", *International Journal of Tourism Research*, Vol. 11 No. 5, pp. 415-437.

Dzogbenuku, R.K. (2013), "Banking innovation in Ghana: insight of students' adoption and diffusion", *Journal of Internet Banking and Commerce*, Vol. 18 No. 3, p. 1.

ELFgee, E. and Arara, A. (2014), "Technical requirements of new framework for GPRS security protocol mobile banking application", *Procedia Computer Science*, Vol. 37, pp. 451-456.

Faqih, K.M. and Jaradat, M.I.R.M. (2015), "Assessing the moderating effect of gender differences and individualism-collectivism at individual-level on the adoption of mobile commerce technology: TAM3 perspective", *Journal of Retailing and Consumer Services*, Vol. 22, pp. 37-52.

Feig, N. (2008), "Mobile banking on the move", *Bank Systems and Technology*, Vol. 45 No. 1, p. 18.

Frambach, R.T. and Schillewert, N. (2002), "Organizational innovation adoption. A multi-level framework of determinants and opportunities for future research", *Journal of Business Research*, Vol. 55 No. 2, pp. 163-176.

Gerrard, P. and Cunningham, B.J. (2003), "The diffusion of internet banking among Singapore consumers", *International Journal of Bank Marketing*, Vol. 21 No. 1, pp. 16-28.

Hernández-Murillo, R., Llobet, G. and Fuentes, R. (2010), "Strategic online banking adoption", *Journal of Banking & Finance*, Vol. 34 No. 7, pp. 1650-1663.

Hernando, I. and Nieto, M.J. (2007), "Is the internet delivery channel changing banks' performance? The case of Spanish banks", *Journal of Banking & Finance*, Vol. 31 No. 4, pp. 1083-1099.

Herzberg, A. (2003), "Payments and banking with mobile personal devices", *Communications of the ACM*, Vol. 46 No. 5, pp. 72-88.

Hoehle, H., Scornavacca, E. and Huff, S. (2012), "Three decades of research on consumer adoption and utilisation of electronic channels: a literature analysis", *Decision Support Systems*, Vol. 54 No. 1, pp. 122-132.

Hyvärinen, T., Kaikkonen, A. and Hiltunen, M. (2005), "Placing links in mobile banking application", paper presented at Proceedings of the 7th International Conference on Human Computer Interaction with Mobile Devices & Services, Salzburg, September, pp. 63-68.

Jayawardhena, C. and Foley, P. (2000), "Changes in the banking sector-the case of internet banking in the UK", *Internet Research*, Vol. 10 No. 1, pp. 19-31.

Jones, W. (2014), "M-commerce: building the opportunity for banks", *Journal of Payments Strategy and Systems*, Vol. 8 No. 3, pp. 300-306.

Juniper Research (2014), "Mobile banking users to exceed 1.75 billion by 2019, representing 32% of the global adult population", available at: www.juniperresearch.com/press-release/digital-banking-pr1 (accessed 1 January 2016).

Kim, S.H. and Huarng, K.H. (2011), "Winning strategies for innovation and high-technology products management", *Journal of Business Research*, Vol. 64 No. 11, pp. 1147-1150.

KPMG (2014), "Mobile banking, global trends and their impact on banks", available at: www.kpmg.com/UK/en/IssuesAndInsights/ArticlesPublications/Documents/PDF/mobile-banking-report-2015.pdf (accessed 16 January 2016).

Kuo, Y.F. and Chen, P.C. (2008), "Constructing performance appraisal indicators for mobility of the service industries using Fuzzy Delphi method", *Expert Systems with Applications*, Vol. 35 No. 4, pp. 1930-1939.

Lau, A.S. (2003), "A study on direction of development of business to customer m-commerce", *International Journal of Mobile Communications*, Vol. 1 Nos 1-2, pp. 167-179.

Laukkanen, T. (2016), "Consumer adoption versus rejection decisions in seemingly similar service innovations: the case of the internet and mobile banking", *Journal of Business Research*, Vol. 69 No. 2, pp. 2432-2439.

Laukkanen, T. and Kiviniemi, V. (2010), "The role of information in mobile banking resistance", *International Journal of Bank Marketing*, Vol. 28 No. 5, pp. 372-388.

Laukkanen, T. and Pasanen, M. (2008), "Mobile banking innovators and early adopters: how they differ from other online users?", *Journal of Financial Services Marketing*, Vol. 13 No. 2, pp. 86-94.

Laukkanen, T., Sinkkonen, S., Laukkanen, P. and Kivijarvi, M. (2008), "Segmenting bank customers by resistance to mobile banking", *International Journal of Mobile Communications*, Vol. 6 No. 3, pp. 309-320.

Lee, H., Harindranath, G., Oh, S. and Kim, D.J. (2015), "Provision of mobile banking services from an actor-network perspective: implications for convergence and standardization", *Technological Forecasting and Social Change*, Vol. 90, pp. 551-561.

Lin, H.F. (2011), "An empirical investigation of mobile banking adoption: the effect of innovation attributes and knowledge-based trust", *International Journal of Information Management*, Vol. 31 No. 3, pp. 252-260.

Lundblad, J.P. (2003), "A review and critique of rogers' diffusion of innovation theory as it applies to organisations", *Development Journal*, Vol. 21 No. 4, pp. 50-62.

Lu Stout, K. (2007), "Dialing up to do business", available at: http://cnn.technology.printthis.clickability.com (accessed 7 February 2015).

McCartney, N. (2002), "Waiting for take-off as early enthusiasm wanes: wireless banking", (*The*) *Financial Times*, 4 September, p. 7.

Mallat, N., Rossi, M. and Tuunainen, V.K. (2004), "Mobile banking services", *Communications of the ACM*, Vol. 47 No. 5, pp. 42-46.

Manoranjan, D., Snigdha, S. and Bhusan, P.B. (2016), "Physician's behavioural style reshaping of mobile banking adoption", *Journal of Internet Banking and Commerce*, Vol. 21 No. 1, pp. 1-17.

Molyneux, P. and Shamroukh, N. (1996), "Diffusion of financial innovations: the case of junk bonds and note issuance", *Journal of Money*, Vol. 28 No. 3, pp. 502-522.

Moser, F. (2015), "Mobile banking: a fashionable concept or an institutional channel in future retail banking? Analysing patterns in the practical and academic mobile banking literature", *International Journal of Bank Marketing*, Vol. 33 No. 2, pp. 162-177.

Mutsune, T. (2015), "No Kenyan left behind: the model of financial inclusion through mobile banking", *Review of Business and Finance Studies*, Vol. 6 No. 1, pp. 35-42.

Nguyen, D.T.H.C., Murphy, J. and Olaru, D. (2003), "Investigating the adoption of electronic customer service by Australian businesses", *Managing Service Quality*, Vol. 13 No. 6, pp. 492-503.

Oh, S., Lee, H., Kurina, S. and Johnston, R. (2005), "Competition and collaboration in mobile banking: a stakeholder analysis", paper presented at the Meeting of the Hong Kong Mobility Round Table, HKUST, 1-3 June, available at: www.people.eng.unimelb.edu.au/sharahk/Papers/MobileBanking_2005.pdf (accessed 15 November 2007).

Onay, C. and Ozsoz, E. (2013), "The impact of internet-banking on brick and mortar branches: the case of Turkey", *Journal of Financial Services Research*, Vol. 44 No. 2, pp. 187-204.

Parvin, A. (2013), "Mobile banking operation in Bangladesh: prediction of future", *Journal of Internet Banking and Commerce*, Vol. 18 No. 1, pp. 1-15.

Patokorpi, E. and Ahvenainen, M. (2009), "Developing an abduction-based method for futures research", *Futures*, Vol. 41 No. 3, pp. 126-139.

Peevers, G., Douglas, G. and Jack, M.A. (2008), "A usability comparison of three alternative message formats for an SMS banking service", *International Journal of Human Computer Studies*, Vol. 66 No. 2, pp. 113-123.

Pousttchi, K. and Schurig, M. (2004), "Assessment of today's mobile banking applications from the view of customer requirement", *Proceedings of the Hawaii International Conference on System Sciences*, *Big Island, Hawaii*, *5-8 January*, available at: http://csdl1.computer.org/comp/propceedings/hicss/2004/2056/07/20560184a.pdf (accessed 16 February 2006).

Powell, C. (2003), "The Delphi technique: myths and realities", *Journal of Advanced Nursing*, Vol. 41 No. 4, pp. 376-382.

Prendergast, G.P. and Marr, N.E. (1994), "The future of self-service technologies in retail banking", *Service Industries Journal*, Vol. 14 No. 1, pp. 94-114.

Riivari, J. (2005), "Mobile banking: a powerful new marketing and CRM tool for financial services companies all over Europe", *Journal of Financial Services Marketing*, Vol. 10 No. 1, pp. 11-20.

Rogers, E.M. (1995), *Diffusion of Innovations*, 4th ed., The Free Press, New York, NY.

Sawford, K., Dhand, N.K., Toribio, J.A.L. and Taylor, M.R. (2014), "The use of a modified Delphi approach to engage stakeholders in zoonotic disease research priority setting", *BMC Public Health*, Vol. 14 No. 1, pp. 1-11, available at: http://bmcpublichealth.biomedcentral.com/articles/10.1186/1471-2458-14-182 (accessed 18 January 2016).

Scornavacca, E. and Barnes, S.J. (2004), "M-banking services in Japan: a strategic perspective", *International Journal of Mobile Communications*, Vol. 2 No. 1, pp. 51-66.

Scornavacca, E. and Cairns, J. (2005), "Mobile banking in New Zealand: a strategic perspective", paper presented at the Hong Kong Mobility Round Table, HKUST.

Scornavacca, E. and Hoehle, H. (2007), "Mobile banking in Germany: a strategic perspective", *International Journal of Electronic Finance*, Vol. 1 No. 3, pp. 304-320.

Senjali, T.A., Metwally, E., Sejjaaka, S., Puplampu, B.B., Michaud, J. and Adedoyin-Rasaq, H. (2014), "LEAD – leadership effectiveness, motivation, and culture in Africa: lessons from Egypt, Ghana, Kenja, Nigeria, and Uganda", *Canadian Journal of Administrative Services*, Vol. 31, pp. 228-244.

Sgriccia, M., Nguyen, H., Edra, R., Alworth, A., Brandeis, O., Escandon, R., Kronfli, P., Silva, E., Swatt, B. and Seal, K. (2007), "Drivers of mobile business models: lessons from four Asian countries", *International Journal of Mobile Marketing*, Vol. 2 No. 2, pp. 58-67.

Shankar, A. and Kumari, P. (2016), "Factors affecting mobile banking adoption behavior in India", *The Journal of Internet Banking and Commerce*, Vol. 21, p. 160.

Singh, S., Srivastava, V. and Srivastava, R.K. (2010), "Customer acceptance of mobile banking: a conceptual framework", *Journal of Management*, Vol. 7 No. 1, pp. 55-64.

Storey, C., Cankurtaran, P., Papastathopoulou, P. and Hultink, E.J. (2015), "Service innovation: a meta-analysis", *Journal of Product Innovation Management*, Vol. 33 No. 5, pp. 527-548.

Sulaiman, A., Jaafar, I.N. and Mohezar, S. (2007), "An overview of mobile banking adoption among the urban community", *International Journal of Mobile Communications*, Vol. 5 No. 2, pp. 157-167.

Sundqvist, S., Frank, L. and Puumalainen, K. (2005), "The effects of country characteristics, cultural similarity and adoption timing on the diffusion of wireless communications", *Journal of Business Research*, Vol. 58 No. 1, pp. 107-110.

Suoranta, M. and Mattila, M. (2004), "Mobile banking and consumer behaviour: new insights into the diffusion pattern", *Journal of Financial Services*, Vol. 8 No. 4, pp. 354-366.

Suoranta, M., Mattila, M. and Munnukka, J. (2005), "Technology-based services-a study on the drivers and inhibitors of mobile banking", *International Journal Management and Decision Making*, Vol. 6 No. 1, pp. 33-46.

Tapio, P. and Hietanen, O. (2002), "Epistemology and public policy: using a new typology to analyse the paradigm shift in Finnish transport futures studies", *Futures*, Vol. 34 No. 7, pp. 597-620.

Thulani, D., Tofara, C. and Langton, R. (2009), "Adoption and use of internet banking in Zimbabwe: an exploratory study", *Journal of Internet Banking and Commerce*, Vol. 14 No. 1, pp. 1-13.

Tiwari, R., Buse, B. and Herstatt, C. (2006), "Mobile banking as a business strategy: impact of mobile technologies on customer behaviour and its implications for Banks", Working Paper No. 37, Hamburg University of Technology, Hamburg, available at: www.global-innovation.net/team/tiwari/PDF/WMCS_2006.pdf (accessed 25 November 2007).

Tiwari, R., Buse, B. and Herstatt, C. (2007), "Mobile banking as a business strategy", Working Paper No. 48, paper presented at the Meeting of the 8th International Research Conference on Quality, Innovation and Knowledge Management, Hamburg, available at: www.tuhh.de/tim/downloads/arbeitspapiere/Working_Paper_48.pdf (accessed 12 March 2016).

Vinayagamoorthy, A. and Sankar, C. (2012), "Mobile banking – an overview", *Advances in Management*, Vol. 5 No. 10, pp. 24-29.

Weber, D.M. and Kauffman, R.J. (2011), "What drives global ICT adoption? Analysis and research directions", *Electronic Commerce Research and Applications*, Vol. 10 No. 6, pp. 683-701.

Yang, A.S. (2009), "Exploring adoption difficulties in mobile banking services", *Canadian Journal of Administrative Services*, Vol. 26 No. 2, pp. 136-149.

Further reading

Albaum, G. (1997), "The likert scale revisited: an alternate version", *Journal of the Market Research Society*, Vol. 39 No. 2, pp. 331-332.

Cohen, E. and Krishnamurthy, B. (2005), "A short walk in the Blogistan", *Computer Networks*, Vol. 50 No. 5, pp. 615-630.

Dearing, J.W. and Meyer, G. (1994), "An exploratory tool for predicting adoption decisions", *Science Communication*, Vol. 16 No. 1, pp. 43-57.

de Reuver, M., Verschuur, E., Nikayin, F., Cerpa, N. and Bouwman, H. (2015), "Collective action for mobile payment platforms: a case study on collaboration issues between banks and telecom operators", *Electronic Commerce Research and Applications*, Vol. 14 No. 5, pp. 331-344.

Gillen, J. (2008), "Are you ready for mobile banking again?", *Texas Banking*, Vol. 97 No. 11, pp. 18-20.

Hasson, F., Keeney, S. and McKenna, H. (2000), "Research guidelines for the Delphi survey technique", *Journal of Advanced Nursing*, Vol. 32 No. 4, pp. 1008-1015.

Hong, S., Thong, J. and Tam, K.Y. (2006), "Understanding continued information technology usage behaviour: a comparison of three models in the context of mobile internet", *Decision Support Systems*, Vol. 42 No. 3, pp. 1819-1834.

Hsu, C.C. and Sandford, B.A. (2007), "The Delphi technique: making sense of consensus", *Practical Assessment, Research and Evaluation*, Vol. 12 No. 10, pp. 1-8.

Joseph, M. and Stone, G. (2003), "An empirical evaluation of US bank customer perceptions of the impact of technology on service delivery in the banking sector", *International Journal of Retail & Distribution Management*, Vol. 31 No. 4, pp. 190-202.

Laukkanen, T. (2007), "Measuring mobile banking customers' channel attribute preferences in service consumption", *International Journal of Mobile Communications*, Vol. 5 No. 2, pp. 123-137.

Lincoln, Y.S. and Guba, E.G. (1985), *Naturalistic Enquiry*, Sage, London.

Ozdemir, S., Trott, P. and Hoecht, A. (2007), "New service development: insights from an exploratory study into the Turkish retail banking sector", *Innovation: Management & Policy & Practice*, Vol. 9 No. 3, pp. 276-291.

Pennings, J.M. and Harianto, F. (1992), "The diffusion of technological innovation in the commercial banking industry", *Strategic Management Journal*, Vol. 13 No. 1, pp. 24-46.

Schumann, J.H., Wunderlich, N.V. and Wangenheim, F. (2012), "Technology mediation in service delivery: a new typology and an agenda for managers and academics", *Technovation*, Vol. 32 No. 2, pp. 133-143.

Skulmoski, G., Hartman, F. and Krahn, J. (2007), "The Delphi method for graduate research", *Journal of Information Technology Education: Research*, Vol. 61, pp. 1-21.

Strang, D. and Soule, S.A. (1998), "Diffusion in organizations and social movements: from hybrid corn to poison pills", *Annual Review of Sociology*, Vol. 24, pp. 265-290.

Corresponding author
Jennifer Mullan can be contacted at: mullan-j5@email.ulster.ac.uk