

Chapter 7

Mobile Banking Adoption: Key Challenges and Opportunities and Implications for a Developing Country



Sujeet Kumar Sharma and Saeed Al-Muharrami

Abstract Technology adoption is one of the promising and growing research domains as new technology emerges continuously. Mobile banking is one of the latest technological innovations and offers multiple benefits and challenges to users and financial institutions. This chapter highlights the recent trends in the banking industry and establishes a relationship between mobile technology and traditional banking systems. Major benefits offered and main challenges faced by mobile banking adoption are discussed in detail. In addition, integration of latest technologies such as big data and cloud computing in the context of banking industry is also discussed. By exploring various dimensions of mobile banking adoption, this chapter provides theoretical and practical implications for researchers and decision-makers from a developing country perspective.

Keywords Mobile banking · Technology adoption · m-Banking benefits · m-Banking challenges

7.1 Introduction

The fast developments in the mobile technologies are the key reasons behind the higher penetration of handheld devices into our daily lives. The subscription of mobile phone users is much higher than fixed line users at global level (International Telecommunication Union, 2014). The latest mobile/handheld devices such as

S. K. Sharma (✉)

Department of Operations Management and Business Statistics, Sultan Qaboos University,
Muscat, Oman

e-mail: drsujeet@squ.edu.om

S. Al-Muharrami

Department of Economics and Finance, Sultan Qaboos University, Muscat, Oman

e-mail: muharami@squ.edu.om

personal digital assistants (PDA), smartphones, and tablets are not only used for phone calls but as sophisticated device, which enables Internet access along with high-speed data transfer and many value-added services (Alalwan, Dwivedi, & Rana, 2017; Alalwan, Dwivedi, Rana, & Simintiras, 2016; Kapoor, Dwivedi, & Williams, 2015a, 2015b, 2014a, 2014b; Liebana-Cabanillas, Marinkovic, & Kalinic, 2017; Shareef, Dwivedi, & Kumar, 2016; Slade, Dwivedi, Piercy, & Williams, 2015; Slade, Williams, Dwivedi, & Piercy, 2015). Mobile banking (m-banking) is defined by Barnes and Corbitt (2003) as “as a channel whereby the customer interacts with a bank via a mobile device, such as a mobile phone or personal digital assistants.” Mobile banking (m-banking) is considered as pioneer banking technology comprising of novelty and innovativeness in comparison with other banking forms such as telebanking and automated teller machines (Püschel, Afonso Mazzon, & Hernandez, 2010). It is expected to increase the number of mobile phone subscribers around the globe that will enhance scope for mobile banking market and hence will provide greater facilities to banking customers and banks (Alalwan et al., 2016; Sharma, Govindaluri, Al-Muharrami, & Tarhini, 2017). Further, mobile banking is also considered as one of the recent mobile technological wonders. In the strict definition of mobile banking, telebanking and Internet banking are not considered as part of it. m-Banking offers a variety of services starting with the most traditional transactions such as fund transfer, payment of school fees, bill payments, trading, or loans to more advanced ones such as automatic check payments, virtual advisory/sales agent, personal savings plan, mobile recharges or predictive cross-selling of products, online booking, and various other financial services. (Baptista & Oliveira, 2016). In spite of having multiple benefits, the use of mobile devices is not at it was expected (Dineshwar & Steven, 2013; Shaikh & Karjaluo, 2015). In 2013, Juniper Research stated that m-banking services will be used by more than 1 million users around the globe by the end of 2017. Further, Juniper Research in 2017 predicted that there would be more than 3 billion users of digital banking by the end of 2021. These numbers motivate us to explore and understand the mobile banking adoption from users and technological point of view.

m-Banking offers two key features such as anytime and anywhere for flexibility in banking systems. The integration of mobile devices and latest mobile and web technologies has changed Internet banking to mobile banking. This chapter provides an overview of the integration of banking system and mobile technology. Further, it discusses the key benefits and challenges of mobile banking adoption from a developing country perspective. In addition, it also discusses the trust and security issues of mobile banking adoption and its economic impact in Oman. This chapter is developed on the basis of philosophical and argumentative approach. Finally, this paper integrates banking sector with two latest web technologies: big data and banking sector and cloud computing and banking sector.

7.2 Banking System and Mobile Technology

Information and communication technology have revolutionized the way things were done earlier. It has spread across every fields of our day-to-day life making things convenient and easy. The banking industry too is no exception. In fact, ICT in the banking sector is the most widespread and acceptable medium that has brought radical changes in the conduct of banking transactions. One such glaring development of ICT is the innovation of mobile technology. Mobile communication technology combined with high-speed Internet in the form of 3G and 4G services is changing the way companies do business, transforming public service delivery and democratizing innovation.

“The mobile platform is emerging as the single most powerful way to extend economic opportunities and key services to millions of people,” says Christine Zhen-Wei Qiang, World Bank economist and editor of a new Bank Group report on information technology and development (World Bank, 2009). Mobile technology has taken hold in everything from media to food service to health care to banking sector and a lot more. Integration of mobile technology is bringing multiple opportunities to banking sector as well as customers. Multiple mobile applications have become integral part of smartphones and connect consumers to service providers directly. The main purpose of mobile applications is to provide services at ease and save time. The GigaOM survey for European Commission estimated that 63 billion euros would be generated in EU economy by the development of mobile applications by 2018 in addition to the creation of 4.8 million jobs. Zamfiroiu (2014) discussed a number of key factors influencing quality of mobile applications from user’s perspective and found that mobile phone storage, mobile device battery life, CPU processing power, and command rapidity are among the key factors. Isac (2013) explored the potential of mobile applications in the banking sector in the context of Romania. Isac found that the number of mobile application users is increasing rapidly, and it can generate substantial amount of funds to Romanian economy and can create a large number of jobs to its people. In Oman, there are mainly five banks offering mobile services to customers. Bank Muscat is the flagship financial service provider in Oman and offers multiple financial services to its customers through mobile devices. Mobile application offered by Bank Muscat in Oman is the serving 350,000 registered customers (TOO, 2015). Mobile banking services complement the vision of supreme leadership to create digital society. In addition, mobile banking services provide by Bank Muscat are in English and Arabic to cater national and international customers.

7.3 Benefits of m-Banking Adoption

The rise of mobile technology has changed the way of conducting banking transactions. Across industries, mobile technology has reduced paperwork and processing times by allowing the instant exchange of digital information. Various services such as balance inquiry, fund transfer, bill payments, credit/debit alerts, transaction history, minimum balance alerts, etc. can be accessed from mobile devices. The following are the main benefits offered through m-banking services:

- *Saves time and money:* m-Banking saves time and money as customers no longer need to visit bank branches or wait in queue and worry about the banking hours to perform banking transactions (Chong, Chan, & Ooi, 2012).
- *Provides instant access:* m-Banking facilitates anytime, anywhere access and instant conduct of transactions. With m-banking customers can transfer funds, pay utility bills, perform balance checks, apply for credit and debit card, and perform a host of other banking transactions all from the pinnacle of their comfort zone and in their convenient time at any hour of the day.
- *Provides enhanced data security:* Banking through mobile reduces the risk of fraud as customers will receive an SMS whenever there is any activity in their account such as deposits, cash withdrawals, fund transfer, etc. Also before conducting any transactions, customers have to provide their user ID and password, which are confidential and are known only to the user. Further, banks use encryption in the form of codes, which can be accessed only by authorized personnel. In addition, banks send onetime password (OTP) on the registered mobile number before conducting any financial transaction. Therefore, m-banking safeguards and protects privacy, identity, and financial information of the customers.
- *Increases efficiency:* As consumers switch to mobile banking services, financial institutions will strive to improve their overall efficiency because huge costs are incurred in maintaining and running of an ATM branch or an on-site bank branches, whereas the costs associated with a mobile transaction are much lower than that. Therefore, this offers a unique opportunity to banks to increase their efficiency as well as lower operating costs.
- *Provides improved access to products and services:* Mobile banking appeals to the consumer on the go; this facilitates its speedy adoption by the public. As mobile banking apps become more advanced and widely available, customers will have a greater opportunity to consider all of their financial options when making any purchase. Moreover, it would give banks the ability to engage with their customers in real time (Brooks, 2014).

7.4 Challenges of m-Banking Adoption

Significant revolutions in the Internet and communication technology over the past few decades have forced banks and financial institutions to embrace m-banking as a strategy for their sustainable growth in an expanded and competitive environment. However, despite the increased use of smartphones and tablets, m-banking application is not much popular among the customers. There are various challenges in developing a sophisticated mobile banking application. Some of these are:

- *Privacy and security concerns*: Security of financial transactions is the most complicated challenge that needs to be addressed jointly by mobile application developers, wireless network service providers, and the bankers to offer a secure infrastructure for financial transaction over wireless network. There should be authentication of the device with service provider before initiating a transaction. This would ensure that unauthorized devices are not connected to perform financial transactions and customer's information is safeguarded. Moreover, security and privacy is on the top of the people priority in developing country like Oman as mobile technology has not reached at the mature level.
- *Scalability and reliability*: Another challenge for the banks is to scale up the mobile banking infrastructure to handle exponential growth of the customer base. With mobile banking, the customer may be sitting in any part of the world (anytime, anywhere banking), and hence banks need to ensure that the systems are up and running in a true 24 × 7 fashion.
- *User-friendly*: Banks need to ensure that their m-banking app is easy to use and is user-friendly. Even though m-banking provides instant access to banking transaction, people often choose to visit bank branches to perform their transactions as they believe payment by cash is easy. Further, payment by cash involves no transaction charge. Therefore, banks should ensure that payment via mobile devices involves no extra transaction charge so that a large number of populations could adopt and use this application.
- *Quality of infrastructure*: Quality of Internet connectivity and other basic services is seen to be an important component of any mobile-based application. Fast, reliable, and speedy Internet connection is the base on which customers will adopt and use m-banking. Without a strong Internet access, customers can distract transactions leading to withdrawal of m-banking app. Therefore, for proper delivery of m-banking app use, a country should first focus on developing its Internet connectivity to a great extent.

7.5 Security and Trust Issues in m-Banking

Mobile banking involves high degree of uncertainty and risk due to its virtual nature (Zhou, 2011). Similar to online banking, mobile banking is built on mobile networks and may be more prone to hacker's attack due to its protocol translation.

Through WAP (Wireless Application Protocol), different types of devices can be used to access the Internet. WAP is vulnerable to hacker's attacks and compression of contents, which are insecure. Therefore, mobile service providers need to build initial trust among users to help them overcome their perceived risk. Trust facilitates users to believe that mobile service providers have enough ability and benevolence to protect their interest by providing them fair and transparent services (Maroofi, Kahrarian, & Dehghani, 2013). Some of the security areas that could be found problematic in building consumers initial trust are:

- *Confidentiality*: Issues such as identity theft, information disclosure to unauthorized individual or systems, replay attacks, and exploits on mobile devices which could disclose personal information to attackers are some of the risk factors on payment via mobile phones. m-Banking should ensure highest priority in maintaining customer's confidential information.
- *Authentication*: It is necessary to ensure that the transaction is being carried out by the person authorized or registered to carry it out. In mobile banking transactions, it is fundamental for users to have the guarantee that the process is carried out by a valid and official bank, not to a fake institution (or individual). Use of two-factor authentication will contribute to more effective identity protection for the consumer and higher identity assurance to the merchant.
- *Data protection and privacy*: Many banks outsource their facilities of handling m-banking customer service to third-party service provider. These result in security issues and minimize the trust of customers in m-banking service. Mobile banking should ensure protection of elements such as GPS location, phone conversation, and exchange of messages or e-mails, passwords, and others. Another risk is the loss of mobile phones; mobile devices can be lost or stolen (more often than PCs). There is increased risk that stolen or lost phones' information could be accessed by unauthorized users who could view sensitive information such as password from the cached memory or auto-fill settings of m-banking app and misuse mobile devices (Chong, 2013).
- *Virus attack and SMS spoofing attack*: Users generally don't install antivirus on mobile phones very often. With no such detection system, a malware won't be detected and other vulnerabilities can be exploited. Viruses like Trojan horses can easily take up password on the web browser or any cached information on operating systems and cause misuse of data. SMS spoofing attack is another such dangerous attack where an attacker can send messages on network by manipulating sender's number (Goyal, Pandey, & Batra, 2012). As most of the banks offer SMS-based mobile banking, building users trust in m-banking would be very difficult if a proper authenticated platform to perform banking transaction is not established.
- *Network security*: Network security is another major concern in m-banking application. Identification of network users, applications, and services to allow only authorized users, maintaining confidentiality, and protecting information from eavesdropping or tampering using encryption technologies are some of the security areas in which m-banking has to work upon (Kaya, 2013).

Risk for the participants in the mobile payment ecosystem depends largely on the role of the entity user, network or communication provider, or payment service provider (ISACA, 2011). Furthermore, ISACA (2011) summarized a brief idea of the type of threats and risks that may crop up across the mobile payment environment.

7.6 Cloud Computing and Banking Sector

Cloud computing was defined by the National Institute of Standards and Technology (NIST) as “a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (i.e., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction” (Mell & Grance, 2011; Sharma, Al-Badi, Govindaluri, & Al-Kharusi, 2016). The resource pooling is considered one of the most prominent features of cloud computing services. Avram (2014) discussed the four key characteristics of cloud computing such as virtual resources, pay-per-use, unlimited resources, and self-service. The usage of cloud computing is transforming the role of the Internet at workplaces. Banks are using cloud computing services to create flexible banking environment as per the need of customers (Asadi, Nilashi, Husin, & Yadegaridehkordi, 2017). Smaller banks can use cloud computing services to save cost by only paying for the services they are using. Benton (2010) discussed two domains where bank customers may use cloud computing applications such as (1) by providing ample opportunities to customers to interact with banks and (2) commonly used cloud-based application, namely, software as service (SaaS), to assist banking users to perform financial activities with banks more easily and effectively without downloading and installing software applications on their devices. Further, banks can use cloud computing services to customer segmentation as well.

There are several advantages of using cloud computing services in the banking sectors. However, there are some considerable concerns with respect to the emerging cloud computing technology. Confidentiality, security, and trust are on the top of these concerns.

7.7 Big Data and Banking Sector

Big data is one of the latest and hotspot technologies of the recent times, which is attracting great attention of researchers from academia, industry, and government sector across the globe. Some experts believe that the big data can be considered as the “new petroleum that will power the future information economy” (Jin et al., 2015). There is no universally accepted and final definition of big data. In Wikipedia, big data is defined as “an all-encompassing for any collection of data sets so large

and complex that it becomes difficult to process using traditional data processing applications.” In comparison with the traditional data sets, big data is being explained with the help of 5Vs, namely, volume, velocity, variety, veracity, and value.

In the banking sector, huge amount of data is being stored since several decades in the databases, and very limited useful information was extracted. Big data can help banks in various ways such as understanding the secrets of money movement and customer behavior. Furthermore, big data can help in extracting meaningful information from large data sets for banks as well as for customers. Big data can be used to understand the customer behavior in the number of domains such as customer life event analysis, next best offer, micro segmentation, real-time allocation-based offerings, and sentiment analysis and enable sales forecasting (Srivastav & Gopalkrishnan, 2015).

The explosion of data is due to the introduction of open-source data technologies in almost all business domains. Gulf News (2017) reported the banks ready to embrace the data revolution would get edge over those that are not. It is right time to review the working of banks in the context of the adoption of new big data technologies. Standard Chartered in Gulf region have put data assets on the key priority. Big data technologies help banking sector in understanding their customers and assure better service quality. Big data technologies are very powerful and can be used to segregate potential cases of money laundering and financial crimes in the context of huge mobile data.

7.8 Economic Impact of m-Banking in Oman

The proliferation of mobile data services supported by increasing 3G and 4G services in recent years has led to the emergence of Internet and m-banking services among customers and businesses. Mobile banking by facilitating anytime, anywhere access has helped not only in reducing the cost of delivering financial services but have also helped in the free flow of money in the economy by making markets and financial transactions more efficient and unleashing entrepreneurship. With the use of m-banking services, banks will need to hire fewer employees, as customers will no longer visit bank branches other than few occasions (Goyal et al., 2012). All this has a direct impact on economic growth of a developing country. As per the GSMA, 2012 report, “For a given level of total mobile penetration, a 10 per cent substitution from 2G to 3G penetration increases GDP per capita growth by 0.15 percentage points” and “a doubling of mobile data use leads to an increase in GDP per capita growth of 0.5 percentage points.” Waverman et al. (2005) by enumerating on the positive economic impacts of mobile telephony services have concluded that “10 more mobile phones per 100 people would increase GDP per capita growth by up to 0.6 percentage points. Studies focusing on developing countries found this impact to be longer, between “0.8 and 1.2 percentage points.” This shows that m-banking would have a great economic impact particularly for countries like Oman, which is in a developing stage in the 3G and 4G markets. m-Banking also

helps in extending the client reach of banks and covers more populations from remote areas to use the service for performing monetary transaction as mobile phones are readily available in every individual household and is a more cheaper medium than Internet banking.

7.9 Conclusion

The information and communication technology is shifting paradigm to individual banks as well as banking sector. Mobile technology will have greater impact on the future economy of developing countries, resulting in multiple benefits for customers, individual banks, and banking sector as a whole. A number of challenges are expected while integrating mobile technology with banking industry. This chapter attempted to explore various facets of mobile banking adoption in order to get familiar with the background of the multiple benefits and challenges of the same from a developing country perspective. The impact of mobile technology on banking sector was discussed. Furthermore, the relationship of the latest mobile technology and banking sector was reviewed. The key benefits and challenges of mobile banking adoption were summarized on the basis of the available literature on the integration of latest technologies and banking sector. In addition, the economic impacts of mobile banking adoption were discussed. Finally, the impact of big data technologies and cloud computing technologies on banking sector were also discussed. Future research lies in the identification of key issues and requirements of banking customers as well as banking industry with respect to mobile banking adoption from developing countries perspective, as substantial literature is available in the context of the developed world. Recently, Sharma (2017) examined mobile banking adoption using technology acceptance model. In line with that, the role of additional antecedents from other established theories (see, e.g., Dwivedi, Rana, Jeyaraj, Clement, & Williams, 2017; Venkatesh, Morris, Davis, & Davis, 2003) should be examined to gain a more comprehensive understanding of factors influencing consumer adoption of mobile banking in the context of developing countries. In addition, future researchers may focus on the development of policies and guidelines to ensure effective and successful mobile banking adoption.

References

- Alalwan, A. A., Dwivedi, Y. K., & Rana, N. P. (2017). Factors influencing adoption of mobile banking by Jordanian bank customers: Extending UTAUT2 with trust. *International Journal of Information Management*, 37(3), 99–110.
- Alalwan, A. A., Dwivedi, Y. K., Rana, N. P., & Simintiras, A. C. (2016). Jordanian consumers' adoption of telebanking: Influence of perceived usefulness, trust and self-efficacy. *International Journal of Bank Marketing*, 34(5), 690–709.

- Asadi, S., Nilashi, M., Husin, A. R. C., & Yadegaridehkordi, E. (2017). Customers perspectives on adoption of cloud computing in banking sector. *Information Technology and Management*, 18(4), 305–330.
- Avram, M. G. (2014). Advantages and challenges of adopting cloud computing from an enterprise perspective. *Procedia Technology*, 12, 529–534.
- Baptista, G., & Oliveira, T. (2016). A weight and a meta- analysis on mobile banking acceptance research. *Journal of Computers in Human Behaviour*, 63, 480–489.
- Barnes, S. J., & Corbitt, B. (2003). Mobile banking: Concept and potential. *International Journal of Mobile Communications*, 1(3), 273–288.
- Brooks, S. (2014). Five positive aspects of M-banking. Retrieved from <http://www.banking.com/2014/08/13/5-positive-aspects-of-mobile-banking#.WAcXH9xOVx8>
- Benton, D. 2010. “How Cloud Computing Will Influence Banking Strategies in the Future”, 15/5/2014, from www.accenture.com/banking.
- Chong, A. Y. L. (2013). A two-staged SEM-neural network approach for understanding and predicting the determinants of m-commerce adoption. *Expert Systems with Applications*, 40(4), 1240–1247.
- Chong, A. Y. L., Chan, F. T. S., & Ooi, K. B. (2012). Predicting consumer decisions to adopt mobile commerce: Cross country empirical examination between China and Malaysia. *Decision Support System*, 53(1), 34–43.
- Dineshwar, R., & Steven, M. (2013). An investigation on mobile banking adoption and usage: A case study of Mauritius. In *Proceedings of the 3rd Asia-Pacific Business Research Conference*, Kuala Lumpur, Malaysia.
- Dwivedi, Y. K., Rana, N. P., Jeyaraj, A., Clement, M., & Williams, M. D. (2017). Re-examining the unified theory of acceptance and use of technology (UTAUT): Towards a revised theoretical model. *Information Systems Frontiers*. Available at <https://link.springer.com/article/10.1007/s10796-017-9774-y>
- Goyal, V., Pandey, S. U., & Batra, S. (2012). Mobile banking in India: Practices, challenges and security issues. *International Journal of Advanced Trends in Computer Science and Engineering*, 1(2), 56–66.
- GSMA. (2012). What is the impact of mobile telephony on economic Growth? A report for the GSM Association, November 2012. Available at <http://www.gsma.com/newsroom/press-release/gsma-and-deloitte-release-comprehensive-research-into-the-impact-of-mobile-telephony-on-economic-growth/>. (Retrieved on November 20, 2012).
- Gulf News (2017). Accessed on 11 June 2017 <http://gulfnews.com/business/sectors/banking/the-big-databanking-security-and-privacyrevolution-1.2041732>.
- Isac, A. (2013). Use of mobile technology in banking services. *Annals of the University of Petrosani, Economics*, 13(2), 109–116.
- ISACA. (2011). *Mobile payments: Risk, security and assurance issues*, An ISACA Emerging Technology White Paper, November 2011. www.isaca.org
- ITU (2015). Global ICT developments. [internet] Retrieved from: www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx.
- Juniper Research. (2013). Mobile banking handset & tablet market strategies 2013–2017. Available at http://www.juniperresearch.com/reports/mobile_banking. Accessed 1 Jan 2014).
- Juniper Research. (2017). <https://www.juniperresearch.com/researchstore/commerce-fintech/worldwide-digital-banking>. Accessed on 28 Apr 2017.
- Jin, X., Wah, B. W., Cheng, X., & Wang, Y. (2015). Significance and challenges of big data research. *Big Data Research*, 2(2), 59–64.
- Kapoor, K. K., Dwivedi, Y. K., & Williams, M. D. (2014a). The interbank mobile payment acceptance in an Indian context. *International Journal of Indian Culture and Business Management*, 8(4), 473–494.
- Kapoor, K. K., Dwivedi, Y. K., & Williams, M. D. (2014b). Conceptualizing the role of innovation-attributes for examining consumer adoption of mobile innovations. *The Marketing Review*, 14(4), 407–430.

- Kapoor, K. K., Dwivedi, Y. K., & Williams, M. D. (2015a). Examining the role of three sets of innovation attributes for determining adoption of the interbank mobile payment service. *Information Systems Frontiers*, 17(5), 1039–1056.
- Kapoor, K. K., Dwivedi, Y. K., & Williams, M. D. (2015b). An empirical examination of the role of three sets of innovation attributes for determining adoption of the IRCTC mobile ticketing service. *Information Systems Management*, 32(2), 153–173.
- Kaya, M. M. (2013). Trust and Security Risks in Mobile Banking (Doctoral dissertation, University of Oxford, UK).
- Liébana-Cabanillas, F., Marinković, V., & Kalinić, Z. (2017). A SEM-neural network approach for predicting antecedents of m-commerce acceptance. *International Journal of Information Management*, 37(2), 14–24.
- Maroofi, F., Kahrarian, F., & Dehghani, M. (2013). An investigation of initial trust in mobile banking. *Internet Journal of Academic Research in Business and Social Sciences*, 13(9), 394–403.
- Mell, P., Grance, T. (2011). The NIST definition of cloud computing (draft), NISTGoogle Scholar.
- Püschel, J., Afonso Mazzon, J., & Hernandez, J. M. C. (2010). Mobile banking: Proposition of an integrated adoption intention framework. *International Journal of Bank Marketing*, 28(5), 389–409.
- Shaikh, A. A., & Karjaluo, H. (2015). Mobile banking adoption: A literature review. *Telematics and Informatics*, 32(1), 129–142.
- Shareef, M. A., Dwivedi, Y. K., & Kumar, V. (2016). *Mobile marketing channel: Online consumer behavior*. Springer International Publishing, USA.
- Sharma, S. K. (2017). Integrating cognitive antecedents into TAM to explain mobile banking behavioral intention: A SEM-neural network modeling. *Information Systems Frontiers*, 1–13. Available at <https://link.springer.com/article/10.1007/s10796-017-9775-x>
- Sharma, S. K., Al-Badi, A. H., Govindaluri, S. M., & Al-Kharusi, M. H. (2016). Predicting motivators of cloud computing adoption: A developing country perspective. *Computers in Human Behavior*, 62, 61–69.
- Sharma, S. K., Govindaluri, S. M., Al-Muharrami, S., & Tarhini, A. (2017). A multi-analytical model for mobile banking adoption: A developing country perspective. *Review of International Business and Strategy*, 27(1), 133–148.
- Slade, E., Dwivedi, Y. K., Piercy, N. L., & Williams, M. D. (2015). Modeling consumers' adoption intentions of remote mobile payments in the UK: Extending UTAUT with innovativeness, risk and trust. *Psychology & Marketing*, 32(8), 860–873.
- Slade, E., Williams, M., Dwivedi, Y. K., & Piercy, N. (2015). Exploring consumer adoption of proximity mobile payments. *Journal of Strategic Marketing*, 23(3), 209–223.
- Shrivastav, U., & Gopalkrishnan, S. (2015). Impact of big data analytics on banking sector: Learning for Indianbanks. *Procedia Computer Science*, 50, 643–652.
- TOO. (2015). Bank Muscat launches all-new, feature-rich mobile banking app. <http://timesofoman.com/article/73867/Business/Bank-Muscat-launches-all-new-feature-rich-mobile-banking-app>
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425–478.
- World Bank. (2009). *Information and communications for development 2009: Extending reach and increasing impact*. Retrieved from <http://live.worldbank.org/information-communications-technology-development>
- Waverman, L., Meschi, M., & Fuss, M. (2005). The impact of telecoms on economic growth in developing countries. *The Vodafone policy paper series*, 2(3), 10–24.
- Zamfiroiu, A. (2014). Factors influencing the quality of mobile applications. *Informatica Economica*, 18(1), 131–139.
- Zhou, T. (2011). An empirical examination of initial trust in mobile banking. *Internet Research*, 21(5), 527–540.

Sujeet Kumar Sharma is an Assistant Professor in the Department of Operations Management and Business Statistics in Sultan Qaboos University, Oman. Dr. Sharma earned his PhD in Statistics. His teaching and research interests include the areas of Business Analytics, Business Statistics, Structural Equation Modeling, Multivariate Data Analysis, Data Mining, Technology Acceptance Model, and Cricket Statistics. His research has been published in journals including *Behavior and Information Technology*, *Information Systems Frontiers*, *Computers in Human Behavior*, *Management Research Review*, *Journal of Enterprise Information Management*, *INFO*, *Review of International Business and Strategy*, *Journal of Modeling in Management*, *Measurement*, *Journal of Indian Business Research*, *European Journal of Sports Science*, and other reputed journals. He has authored a book on computer-based numerical and statistical techniques.

Saeed Al-Muharrami is an Associate Professor of Banking and Finance at Sultan Qaboos University. He received his BSc in 1988 from University of Arizona, USA, his MBA in 1994 from Oregon State University, USA, and his PhD in 2005 from Cardiff University, UK. He has written three books and has published several scientific papers and publications. Besides his teaching and research duties, he was the Director of Humanities Research Center and the Dean of the College of Economics and Political Science. He was previously appointed as Fulbright Visiting Scholar at the International Monetary Fund in Washington, D.C., USA.