

Drivers of resistance to and adoption of the Internet of Things (IoT) and its impact on the use behaviour in the banking sector

Rana AbdElMohsen
Cairo University
Gamal AbdElAziz
Cairo University

Cite as:

AbdElMohsen Rana, AbdElAziz Gamal (2020), Drivers of resistance to and adoption of the Internet of Things (IoT) and its impact on the use behaviour in the banking sector. *Proceedings of the European Marketing Academy*, 49th, (62795)

Paper from the 49th Annual EMAC Conference, Budapest, May 26-29, 2020.



Drivers of resistance to and adoption of the Internet of Things (IoT) and its impact on the use behaviour in the banking sector

Abstract

The Internet of Things (IoT) is one of the challenges of the revolution of the internet and a trendy topic in the area of new-age technologies. This research aims to investigate the drivers that lead to the adoption of and resistance to the Internet of Things and its impact on use behaviour in the banking sector.

Twenty semi-structured interviews were conducted with bank managers, employees and clients to investigate the banking service in terms of perceived utility, perceived complexity, safety and privacy according to their awareness of the service and their educational level. Based on the qualitative findings, a quantitative study is planned to take place which will involve 600 participants via an online survey to test the qualitative finding empirically. This research has major implications in providing a complete understanding of the drivers that lead to the adoption of or resistance to IoT through use behaviour in the banking sector.

Keywords: IoT adoption, IoT resistance, banking sector

Track: Consumer Behaviour

1. Introduction

The Internet of Things (IoT) is the main constituent of the Industrial Revolution 4.0 (Want et al., 2015), whereby it is expected there will be 26 billion IoT devices in the marketplace by 2020 (Gartner, 2013). In essence, IoT provides interconnectedness through devices at any time worldwide in every aspect of daily life (Want et al., 2015). Hence, IoT adoption is considered to be essential in providing a competitive advantage, especially in the modern economy. Interconnectedness through IoT devices is deemed to be efficient with high security, privacy, and high quality (Weinberg et al., 2015).

The IoT is the next big step in the financial services. The IoT is the network of connected devices that allow sending and receiving the data (Infosys report, 2018). Smart banking service is a high potential development area (Eckenrode, 2015). The smart banking services includes many tools that research would focus on; the Point Of Sale device (POS), the Nearest Field Communication (NFC), the mobile applications, T 24 tracking system, Card 400, workflow, BBM and swift alliance. The smart banking tools that have been established by IoT allow facilitating the banking transactions with the consumers. Also, it allows banks to track the consumers' accounts and to provide the best option for utilizing the money.

Previous IoT studies have focused on two main research areas: reasons for the adoption of IoT and resistance to IoT. Accordingly, this research focuses on two-fold objectives. First, to identify the drivers for adoption of IoT and those of IoT resistance in one research model. Second, to explore how the moderating effect of awareness and educational level could influence reasons for and against IoT adoption with use behaviour in the banking sector.

2. Theoretical Background

Previous research is classified into research around the adoption of innovation (Rogers 1962) and consumer resistance to innovation (Ram and Sheth 1989). While some researchers have argued that the adoption factors are distinct antecedents that differ from factors that lead to resistance to innovation (Garcia et al. 2007), others have argued that the two factors overlap (Day and Herbig 1992) and might even be considered opposites in consumers' minds. Interestingly, three main factors are deemed to be drivers for both IoT adoption and IoT resistance: perceived utility, perceived complexity, and security. Therefore, this study aims to fill the research gap highlighted in previous studies by investigating the drivers to the adoption of and resistance to IoT in the banking sector.

3. Research Methodology

This research adopts a pragmatic worldview that incorporates a sequential exploratory mixed-method approach including qualitative and quantitative research methods, respectively. The qualitative phase included an exploratory study using semi-structured interviews with relevant bank managers, employees and customers while the quantitative phase will incorporate surveys.

3.1. Qualitative Procedures

The qualitative study was conducted to establish a deep understanding of the reasons for and against the adoption of the Internet of Things in the banking sector. The qualitative research method was conducted using 15 semi-structured interviews conducted with clients of different banks and 5 semi-structured interviews with bank managers and employees from the IT department. The participants in this phase were clients of banks who usually use banking services. Therefore, the qualitative study helped to extract explicitly the drivers for the adoption of and resistance to the use behaviour of the banking sector.

This study incorporated interviews with both educated and non-educated bank clients to understand the role of education on the use behaviour of the banking sector. Clients' interviews included ten interviews with educated clients and five non-educated clients who varied in age (27 to 57 years old) and work in a variety of occupations (school owners, accountant, bank official, freelancer, factory workers). The twenty interviews lasted from 20 to 30 minutes per interview. Nine hours of interviews to 35 single-spaced pages and were analysed using thematic analysis.

3.2. Qualitative Findings

Although all the respondents were bank clients who use banking services, respondents were divided into e-banking service users and e-banking service non-users. First, the e-banking service users explained their reasons for using the service. For example, client one expressed that *"The e-banking service is very beneficial to me, I can settle my credit card, transfer from and to my accounts, pay donations, make an account inquiry and I can manage all these services from home"*. Client two also expressed that *"The banking sector save money and energy; I could do many banking services at home instead of paying money on transport and having a working day off"*. Client three mentioned that *"The bank's website is very secure, every time I use the banking sector; I am asked for the username and password for my e-banking account. Besides, if I leave my mobile open for one minute on the e-banking account without doing any transaction, I am automatically logged out of the website and I am*

asked for the password of the account again". Client four stated that *"The e-banking service is very beneficial when you have to make transactions and you are abroad"*. Client five mentioned that *"The POS machines facilitate to me the payments when I have no cash"*.

On the other hand, some respondents explained their reasons for not using the banking sector. Client one stated that *"I don't use the banking sector; I don't see benefits behind using the banking sector, I can do any acquirement through the customer services in the bank"*. Client two expressed that *"I am afraid that my account may be hacked if I use the banking sector"*. Client three mentioned that *"I don't mind if the company uses my personal information to send me any offers, but I have a huge problem if they call me and insist on selling me their products"*. Client four explained that *"I face difficulty in dealing with the internet banking website; I always face login problems with the website"*. Client five said that *"I am afraid using the contactless machines because I don't see the amount before deduction. Besides, using these machines would facilitate stealing the money if the card is lost, there is no pin recruited when dealing the contactless machines"*. Client six mentioned that *"The idea of knowing that there are systems that track my account makes me confused and feel with a lack of my privacy"*.

The researcher extracted from the interviews that awareness is the main factor affecting the use of the banking sector. Client one expressed that *"I don't know that there is a service that I could access my bank account through; I think that it is a good service that I would ask to use it"*. The researcher also interviewed bank users who are not well educated, and these preferred not to use the banking sector. Client one stated that *"I do not choose using the banking sector because I do not know how to use it and I do not know the steps of using the bank mobile applications"*.

Interviews with IT officers resulted in providing several tools that the bank uses in facilitating the banking services for the consumers. In addition, to track the consumers' account to provide advice to consumer on how to best utilize the money. Officer one stated that *"Banks use the POS to facilitate payments to the users through deducting the amounts via Point Of Sale machines and now there is a contactless machine that is used without entering the pin code that is working through NFC systems which explicit the payment transaction"*. Officer two mentioned that *"There is a network that is called T24 that includes all the information for every consumer in order to track the accounts of consumers"*. Officer three said that *"There is a network that is called card 400 that include all the data of the credit cards that we could track on all the information of consumers"*. Officer four mentioned

that “There is the BBM system that executes the requests of the consumers when applying for a chequebook either from the application, website or the branch”. Client five expressed that “The swift alliance is the system that executes the transfers inside and outside the country that are requested by the consumers online or offline”.

3.3. Quantitative Phase

The quantitative research will be conducted on a non-probability purposive sample of 600 e-banking consumers and will also test the effectiveness of educational level and consumer awareness as moderators for the IoT framework; therefore, the participants of the study are bank clients of different educational levels. Data collection will take place from January 2020 to March 2020, and by the time of the EMAC conference, data will have been analysed AMOS statistical software.

4. Hypotheses Development for Quantitative Study

The research hypothesis has conducted from the previous researches and the exploratory study that has been conducted by the researcher.

4.1. Privacy Concerns

The processing of data is one of the main issues of the application of IoT, whose existence depends on data, especially that which is related to consumers. Data processing allows organizations that are interconnected to access and utilize information about consumers, such as where the consumer is located and how the consumer behaves. The organization can track the consumer’s information such as their birth date, level of income, the things they like or comment on in social media, with the consumer’s data being passed from one machine to another. However, respecting the privacy of the consumer is viewed as one of the most important aspects of consumer experience with IoT (Weinberg et al., 2015) and one of the main drivers of consumer resistance to the adoption of innovation (Demoulin and Zidda 2009). Therefore, the first hypothesis is:

H1: There is a positive relationship between privacy concerns and resistance to IoT.

4.2. Perceived Utility

Perceived utility refers to the experience outcome that is perceived by the consumer. Davis (1993) defines perceived utility as the perception of an individual that using the new technology will enhance job performance. Additionally, Mathwick et al. (2001) define perceived utility as the extent to which a person perceives a certain system to boost the performance of a job. More specifically, perceived utility is how a certain system performs a certain task according to the perception of the consumer. In other words, according to what

the consumer believes about the performance of this system regarding a specific task. This perception or belief could be in favour of the adoption of innovation or it could be against the adoption of innovation. Therefore, the second hypothesis is:

H2: There is a positive relationship between perceived utility and adoption of IoT.

From the resistance to innovation perspective, perceived utility is considered an important driver for consumer resistance to innovation (Mani and Chouk, 2017), whereby some consumers view IoT as a useless innovation. Besides, lack of ease of use is also considered one of the challenges that face the adoption of the IoT (Tornatzky and Klein, 1982). Therefore, the third hypothesis is:

H3: There is a positive relationship between perceived utility and resistance to IoT.

4.3. Security Aspects

Security is defined as the protection of assets, people and information for individual and community safety (Craighead, 2003). In essence, commercial security is viewed by institutions as the prevention of unauthorised, undesired loss that can be caused to the organisational assets (Post and Kingsbury, 1991). Security is considered as risk management, technology security, prevention of loss and prevention of crime (Brooks, 2007) and is one reason why consumers do not trust the technology of the internet (Lee and Turban, 2001). Consequently, security is one of the main factors related to an unwillingness to use the internet in commercial transactions (Madu and Madu, 2002). Moreover, other consumers contemplate IoT usage as a great risk in terms of privacy (Madu and Madu, 2002) and safety (Demoulin and Zidda 2009). Therefore, the fourth and fifth hypotheses are:

H4: There is a positive relationship between security and resistance to IoT.

H5: There is a negative relationship between security and adoption of IoT.

4.4. Perceived complexity

Perceived complexity is the degree to which innovation is perceived to be difficult to use (Rogers 2003) and it is viewed to have a negative relationship with the adoption of innovation (Tornatzky and Klein 1982). When introducing new technology, there may be a conflict between the new knowledge that should be used and the existing knowledge (Armstrong and Hardgrave 2007); the new knowledge can result in a change in the process of organizational structure and work as a whole (Lyytinen and Rose 2003), which will eventually lead to an increase in the technology's complexity and the time span of the decision-making process (Ciganek et al., 2012). Also, complexity exists when the new technology is not readily available which results in an error in the decision making (Liu et al.

2012). The perceived complexity is the lack of ease of use (Davis 1989). The degree of complexity affects negatively on the adoption of innovation (Ciganek et al., 2012). In other words, perceived complexity has a positive relationship with resistance to innovation. Therefore, the sixth and seventh hypotheses:

H6: There is a negative relationship between perceived complexity and adoption of IoT.

H7: There is a positive relationship between perceived complexity and resistance to IoT.

4.5. Education and Awareness

This study explores the moderating variables that influence IoT adoption and resistance. These moderating variables are educational level and consumer awareness. Such variables are prominent in overcoming the challenges and barriers to innovation resistance and encouraging innovation adoption. Education contributes to the knowledge of innovation which in turn influences the adoption of innovation (Rogers, 2003). Therefore, the eighth hypothesis is:

H8: Educational level is a moderator between drivers in terms of concern for privacy, perceived utility, safety and perceived complexity with both resistance to IoT and adoption of IoT with use behaviour

Indeed, innovation awareness is necessary with today's technological advancements (Sambamurthy et al. 2003). Moreover, level of education explains the difference in innovation knowledge (Rogers, 2003). Therefore, the ninth hypothesis is:

H9: Awareness is a moderator between drivers in terms of concern for privacy, perceived utility, safety and perceived complexity with both resistance to IoT and adoption of IoT with use behaviour.

4.6. Use Behaviour

Claudy et al. (2015, p.541) state that "research could apply behavioural reasoning theory to identify determinants of the actual adoption behaviour, exploring how personality traits influence relationship between reasoning and behavioural response to innovation could be a fruitful avenue for future research". Therefore, the final two hypotheses are:

H10: Resistance to IoT has a negative relationship with use behaviour.

H11: Adoption of IoT has a positive relationship with use behaviour.

5. Research Implications

The research has a numerous of theoretical and practical implication; from the theoretical implication, this research fills the gap in the literature by examining the drivers for and resistance to the adoption of the Internet of Things in one conceptual model. Furthermore, it investigates the reasons that affect the drivers for adoption of and resistance to the Internet of Things with use behaviour of the banking sector. Regarding the managerial implications, focusing on innovation through resistance approach would help organizations to avoid or reduce innovation failure. The research emphasizes that managers in the banking sector should increase consumers' awareness of using the banking sector and eliminates the factors that lead to consumer resistance. The use of the banking sector would lead to reducing the workload of branches and would save consumers' time and effort.

References

- Armstrong, D. J., & Hardgrave, B. C. (2007). Understanding mindshift learning: the transition to object-oriented development. *MIS Quarterly*, 453-474.
- Brooks, D. J. (2008). Defining the science of private security through knowledge categorisation. *Acta Criminologica: Southern African Journal of Criminology*, 2008(Special Edition 1), 12-23.
- Ciganek, A. P., Haseman, W., & Ramamurthy, K. (2014). Time to decision: the drivers of innovation adoption decisions. *Enterprise Information Systems*, 8(2), 279-308.
- Claudy, M. C., Garcia, R., & O'Driscoll, A. (2015). Consumer resistance to innovation—a behavioral reasoning perspective. *Journal of the Academy of Marketing Science*, 43(4), 528-544.
- Craighead, G. (2009). *High-rise security and fire life safety*. Butterworth-Heinemann.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 319-340.
- Davis, F. D. (1993). User acceptance of information technology: system characteristics, user perceptions and behavioral impacts. *International journal of man-machine studies*, 38(3), 475-487.
- Demoulin, N. T., & Zidda, P. (2008). On the impact of loyalty cards on store loyalty: Does the customers' satisfaction with the reward scheme matter?. *Journal of Retailing and Consumer Services*, 15(5), 386-398.

- Eckenrode, J. (2015). " The derivative effect: How financial services can make IoT technology pay off.
- Garcia, R., Bardhi, F., & Friedrich, C. (2007). Overcoming consumer resistance to innovation. *MIT Sloan management review*, 48(4), 82.
- Herbig, P. A., & Day, R. L. (1992). Customer acceptance: the key to successful introductions of innovations. *Marketing Intelligence & Planning*, 10(1), 4-15.
- Lee, M. K., & Turban, E. (2001). A trust model for consumer internet shopping. *International Journal of electronic commerce*, 6(1), 75-91.
- Liu, X., Ghorpade, A., Tu, Y. L., & Zhang, W. J. (2012). A novel approach to probability distribution aggregation. *Information Sciences*, 188, 269-275.
- Lyytinen, K., & Rose, G. M. (2003). The disruptive nature of information technology innovations: the case of internet computing in systems development organizations. *MIS quarterly*, 557-596.
- Madu, C.N. and Madu, A.A. (2002). "Dimensions of e-quality", *International Journal of Quality and Reliability Management*, Vol. 19 No. 3, pp. 246-58.
- Mani, Z., & Chouk, I. (2017). Drivers of consumers' resistance to smart products. *Journal of Marketing Management*, 33(1-2), 76-97.
- Mani, Z., & Chouk, I. (2018). Smart banking: Why it's important to take into account consumers' concerns?.
- Mathwick, C., Malhotra, N. K., & Rigdon, E. (2002). The effect of dynamic retail experiences on experiential perceptions of value: an Internet and catalog comparison. *Journal of retailing*, 78(1), 51-60.
- Middleton, P., Kjeldsen, P., & Tully, J. (2013). Forecast: The internet of things, worldwide, 2013. *Gartner Research*.
- Post, R. S., Kingsbury, A. A., & Schachtsiek, D. A. (1991). *Security administration: An introduction to the protective services*. Boston: Butterworth-Heinemann.
- Ram, S. (1989). Successful innovation using strategies to reduce consumer resistance An empirical test. *Journal of Product Innovation Management: AN INTERNATIONAL PUBLICATION OF THE PRODUCT DEVELOPMENT & MANAGEMENT ASSOCIATION*, 6(1), 20-34.

- Rogers, E. M. (2003). *Diffusion of innovations*, New York, NY: Free. Retrieved on February 03, 2013.
- Sambamurthy, V., Bharadwaj, A., & Grover, V. (2003). Shaping agility through digital options: Reconceptualizing the role of information technology in contemporary firms. *MIS quarterly*, 237-263.
- Tornatzky, L. G., & Klein, K. J. (1982). Innovation characteristics and innovation adoption-implementation: A meta-analysis of findings. *IEEE Transactions on engineering management*, (1), 28-45.
- Want, R., Schilit, B. N., & Jenson, S. (2015). Enabling the internet of things. *Computer*, (1), 28-35.
- Weinberg, B. D., Milne, G. R., Andonova, Y. G., & Hajjat, F. M. (2015). Internet of Things: Convenience vs. privacy and secrecy. *Business Horizons*, 58(6), 615-624.