A CONCEPTUAL MODEL OF INTENTION TO ADOPT BYOD AMONG HCP IN PAKISTAN

Saima Nisar[a*], Wan Rozaini bt Sheik Osman[a]

[a]School of Computing, College of Arts and Science, UUM, Universiti Utara Malaysia, 06010, Sintok, Kedah, Malaysia

*Corresponding author
saimaanisar@gmail.com

Abstract

Healthcare facilities and manpower in Pakistan are a generally acute shortage, incompetent. congested and overburden which cannot meet the requirements of the people visiting these facilities. Medical sectors are progressively looking for portable solutions to meet their Information Technology (IT) needs. To identify Healthcare Professionals (HCP) intention in both adopting the Bring Your Own Device (BYOD) and concerns related to security and privacy of their devices, the researchers propose a conceptual model by integrating the Consumer Acceptance and Use of Information Technology Extending the Unified Theory of Acceptance and Use of Technology (UTAUT2) and Protection Motivation Theory (PMT) which would impact their behavior intention in both using the device and provide the good understanding of concerns about security and privacy of their devices.

Keywords: Information Technology, BYOD, Healthcare Professionals, UTATU2, PMT

1.0 INTRODUCTION

Rising innovations can go far toward upgrading the personal satisfaction and enhancing prosperity [1]. The providing and administration of shrewd healthcare services administrations have seen noticeable changes also, as an after effect of ICT [2].

The latest progress regarding mobile technologies has facilitated mobile devices to perform functions previously not possible with handheld devices [3]. According to National Institute of Health (NIH) [4], mHealth is the use of mobile and wireless devices (cell phones, tablets, etc.) to enhance healthcare services, health research, and health outcomes. The utilization of wireless communication devices to maintain general health and clinical practice has great potential to enhance this saintly cycle. More than whatever other advance innovation, mobile phones are used throughout the developing world [5]. Innovative utilizations of portable technology to existing medicinal services conveyance and supervising frameworks offer a great guarantee for enhancing the personal satisfaction. They make correspondence among researchers, clinicians, and patients simpler, and as the chronic disease becomes more prevalent, mobile advancements offer consideration techniques that are especially suited to battling these conditions[6].

Enterprise administration made Bring Your Own Device (BYOD) is a buzz-acronym nearly 10 years ago when they began appearing at work with a BlackBerry in hand. At the point when smarts were added to that Personal Digital Assistant (PDA), employees found that they could take their office on the road [7]. This idea is often mentioned to as BYOD and refers to utilizing one's very own personal device for non-personal or business related activities. Particularly, it refers to the aspect of individuals conveying their own portable devices to work, school, or any other organization where in the past they just could utilize that organization's technological device to access data and processes [8].

1.1 Problem Statement

Pakistan's ministry for healthcare has anticipated that Pakistan is acknowledging remarkable benefits from the developing information economy. This indicates in the recent infrastructure investment and another innovative improvement. Regardless of this development, it shows that Pakistan is lagging behind in medical services provision [9]. According to [10]Healthcare Professionals (HCP) utilizing their BYOD react more quickly to medical results, have fewer errors in drug prescription, and show bettered data management and record keeping practices. Moreover, HCP can use their portable devices at the various area as many doctors work at more than one hospital or medical facility [11][12].[13][14][15][16].

As such, working in the medical system requires broad mobility of HCP and additionally, collaboration and communication with different peoples, including their colleagues and patients [17]. Since personal digital

assistants (PDAs) were presented in the 1990s, BYOD continues to allow healthcare providers to professionally gather, retrieve, collect, store and share data [18]. Unlike any other HIT platform the BYOD is fundamentally a reasonably portable device that allows users to do tasks anytime, anywhere [19]. The BYOD-enabled portable healthcare solution that best suits HCP, helping them delivers high-quality medical care. BYOD can facilitate all patients' processes, including patient registration, prescription filling, drug preparation and distribution, specimen collection and treatment, infusion, first aid, surgery, and account closure upon discharge. BYOD can use scan patient barcodes on wristbands to precisely and rapidly recognize patients. This way is convenient, error-free, and simple. BYOD additionally use to achieve and enter treatment plans. This reduces workload, avoids repeated data entry, reduces workload, and guarantees data accuracy.

A better comprehension of the health technology acceptance behavior should be seen not only from a technology acceptance perspective but also as a health behavior perspective [20]. For this reason, we intend to fill this research gap with our study. This study will look at the intention to adopt BYOD among HCP to improve healthcare in Pakistan using Consumer Acceptance and Use of Information Technology Extending the Unified Theory of Acceptance and Use of Technology (UTAUT2) and Protection Motivation Theory (PMT).

2.0 THEORETICAL BACKGROUND

2.1 Bring Your Own Device

Bring Your Own Device (BYOD) is closely associated with IT consumerization [21], which various scholars view as the dual use of IT for business and private purpose [22][23] or as the adoption of employee's devices, applications, and tools in the workplace [24]. Mobility extends the internet providing and computing more independence to employees and their personal life and at work [25] allowing for the "anything, anywhere, anytime" scenario [26].

The word BYOD was first used by Ballagas et al., at UBICOMP 2004 [27]. BYOD entered in 2009, courtesy of Intel when it accepted an increasing tendency among its employees to bring their own devices to work and connect them to the corporate network[28]. The adoption of BYOD addressed different organizational needs; namely, the need for mobility, the need to keep employees satisfactorily engaged in every aspect of the business process, the need to improve the business environment or workplace, the need to attract young talents and retain skillful workforces, and so forth, and the need for attaining business goals or profits, [29][30][28][31]. These needs generally resulted in major improvement in terms of employee mobility enhancement, retention, improved corporate-customers relationship through various innovative ways, improved IT value to the business, a more flexible work environment, improved business continuity, the ability to access content from any device anywhere and at any time, familiar technologies and increased motivation, an agile workforce, and greater flexibility in collaboration, familiar technologies and increased motivation, information sharing, and communication [32][33][34]; [35]. The mainly accepted BYOD devices are smartphones, laptops, mobile, and tablets[26]. Nowadays, BYOD is sufficiently advanced to perform better than the traditional devices provided to the employees by their organizations. The greater part is that the employees want their own device as it is better than what their organizations supplied in terms of productivity. Employees desire devices that reflect them and are not selected by the organization [36][37].

Electronic systems are incredibly resourceful at distributing and storing data. The nature of portable devices makes them suitable for getting to data in support of ultimately learning, decision making and problem solving [38]. In the healthcare industry, BYOD was seen as a helpful trend that conveyed a lot of benefits to healthcare providers, hospital, and patients. BYOD-enabledHCP to work in quick, smarter and professional way[39]. BYOD increased patient satisfaction, as it permitted quick access to caretakers and assured real-time responses [40]. BYOD brought changes to the medical work process by increasing coordination through communication and cooperation, improving access to data, implement interdisciplinary workforce processes which were extremely vital in today's healthcare environment, and increasing satisfaction with both physicians and patients [41]. BYOD encourage the adoption of evidence-based clinical practices [18]. In healthcare, portables electronically help the memory of HCP at the point of care delivery to increase patient safety, to reduce medical errors, and to increase the continuity of services provided to patients [38].

Table 1 Overview of Existing Studies on BYOD (Source Ortbach, 2015)

Authors with year	Dependent Construct	Definition of Dependent Construct	Independent Variables, Mediators, and Moderators	Theoretical Lens	N
Chen, 2014	Continuance Intention of personal IT device (PITD) use	Intention that users plan to use the same PITD(s) to perform the similar tasks in the future given that the consistency of the portfolio available to them	Flexibility of Multiple PITD Use, Task Complexity2, Affective Appraisals, Cognitive Appraisals, Satisfaction	Psychological Reactance Theory	n/a
Weeger and Gewald, 2014	Behavioral intention (BYOD)	Behavior intention to participate in a corporate BYOD program	Financial Risk, Performance Risk, Privacy Risk, Psychosocial Risk, Safety Risk, Security Risk, Perceived Risk1, Perceived Benefit, Personal innovativeness with IT	Net-valence model and Perceived Risk Theory	71
Ortbach, Koffer, Bode, et al., 2013	Consumerization intention / consumerization behavior	Using other technologies than those provided by the individuals' company to perform work tasks within the next two months	Attitude towards IT Consumerization Behavior, Subjective Norms regarding IT Consumerization Behavior, Perceived Behavioural Control of IT Consumerization Behavior	Theory of planned behavior (+ belief analysis)	73
Lebek et al., 2013	Intention to Use (BYOD)	Intention to use private mobile devices for working purposes	Security Concerns, Privacy Concerns, Legal Concerns, Perceived Uncertainty, Attitude, Perceived Benefits	Theory of Reasoned Action, Technology Acceptance Model	151
Lee et al., 2013	BYOD Adoption Behavioural Intention, BYOD Adoption	Intention to participate in a BYOD program	Tasks Measured, Frequency, Justification, Organizational Control, Mobile User's Information Privacy Concerns, Job Performance Expectancy, Mobile Computing Self-Efficacy	Theory of Planned Behavior	n/a
Loose, Weeger, et al., 2013	Behavioral intention (BYOD)*	BYOD service adoption by future employees	Perceived Business Threats, Perceived Private Threats, Perceived Threats1, Social Influence, Effort Expectancy, Performance Expectancy	UTAUT	84
Dernbecher et al., 2013	Consumerization	Continuance of privately owned devices and software usage in a work environment	Personal innovativeness, Self-efficacy, Habit	Switching Theory	74
Ortbach, Bode, and Niehaves, 2013	Consumerization intention	Intention to use other technologies than those provided by the company to perform work tasks within the next two months	Expected Performance Improvement, Consumerization Behavior of Co-workers, Personal Innovativeness in IT	Theory of Reasoned Action	60
Hopkins et al., 2013	Behavioral Intention (BYOD)	Student's Behavioural Intention to use their Own Device	Compatibility, Perceived Ease of Use, Perceived Usefulness, Attitude1, Teacher Influence, Parental Influence, Peer Influence, Subjective Norm1,Self-Efficacy, Learning Autonomy, Facilitating Conditions, Perceived Behavioural Control	Theory of Planned Behavior	386

* Final dependent construct of the study was employer attractiveness
1 used as mediator
2 used as moderator

2.2 Healthcare In Pakistan

Medicine has long been considered as holy professions in Pakistan too[43]. But slowly a HCP's job has lost its charm as it used to be in past. The main cause of this constricted job satisfaction is huge job stress which a HCP suffer during the performance of his job. Although extraordinary stressors at work add vastly to the reduction of attraction for this erstwhile most preferred profession. The similar fact remains true

for Pakistan where too much psycho-socio stressors have made HCP more prone to worst job satisfaction[44]. Unhappy HCP may be not able to offer an affectionate and caring treatment to patients; HCP may also disregard patients because of lack of interest or focus in the job. A national study showed that 26% family physicians in Pakistan were dissatisfied with their profession [45]. In Karachi, 68% of the doctors were not happy with their jobs [46]. Another study revealed that physicians were most dissatisfied with the reforms and the workload[44][47]. Another local study [48] on a small number of patients discovered the medication error of 39.28%. This included dose, not specifying maximum dose, polypharmacy, dosage form error and ambiguous medication order. A local newspaper [49] reported that medical errors are the eighth leading reason of death in this country and about 7,000 people per year are estimated to die from medication errors alone. The absence of career structure for HCP is another cause that directs them to work for the considerable length of time resulting in medical errors[50]. Medical errors not just influence the success of medication therapy [51]; [52]; [53]additionally raise the expense of treatment.

The lifecycle of information technology (IT) has changed significantly throughout the last two decades, as the driving force has shifted from industry to customers [54], The accessibility of portable devices and the fall in prices for voice/data communication via mobile networks has resulted in the extensive diffusion of portable devices for personal use [55][56].

3.0 THE PROPOSED CONCEPTUAL MODEL

Despite the fact that it is supposed that a theory is a social construction developed and shared by groups of researchers [57]; [58] there is a division between theoretical concepts and real-world phenomena. A comparative conceptualization of theory (and similar terminology) is utilized by [57], who describes the phenomena of research inquiry as someone's perceptions of facts in the real world.

In Technology Acceptance perspective UTAUT2 is the most widespread one to explain healthcare professionals' technology acceptance. The main idea of the TAM, and merging it with other established variables from presented literature, Ventakesh, Morris, Davis, & Davis revised the existing leading user acceptance models into a model called the UTAUT. Venkatesh et al. (2003) conducted a meta-analysis for eight known technology acceptance model constructs with the aim to explain the user behavior in accepting and using information technology and came out with a unified comprehensive model. Venkatesh [59] empirically tested and compared eight prominent models that measured users' intention to adopt the technology. With these results, [59] proposed a new model called the Unified Theory of Acceptance and Use of Technology (UTAUT) model that combined seven significant constructs of the eight models. In the case of UTAUT, which was originally developed to explain employee technology acceptance and use, it will be critical to examine how it can be extended to other contexts, such as the context of consumer technologies, which is a multi-billion dollar industry given the number of technology devices, applications, and services targeted at consumers, against this backdrop [60] extend the UTATU in a consumer context and proposed that the UTAUT model should incorporate three additional constructs in efforts to further strengthen the existing model. The three additional constructs are (a) Hedonic Motivations, (b) Price Value, and (c) Habit-based on theories of previous studies [60] [61]. The moderating variables of age, gender, and experience were kept the same as the original model. Compared to UTAUT, the extensions proposed in UTAUT2 produced a substantial improvement in the variance explained in behavioral intention (56 percent to 74 percent) and technology use (40 percent to 52 percent).

Protection Motivation Theory (PMT) was developed by [62] as a framework for understanding the effect of fear appeals. A modification of PMT [63] extended the theory to give a more general account of the impact of persuasive communications, with importance on the cognitive processes that mediate behavior change. Resulting research on PMT has typically taken two forms: first, PMT has been used as a framework to develop and evaluate persuasive communications; and second, PMT has been used as a social cognition model to expect health behavior [64]. The PMT mostly contain four variables: (1) Perceived Vulnerability, (2) Perceived Severity, (3) Response Efficacy, and (4) Self-Efficacy. IS security research on a regular basis utilizes PMT to comprehend an individual's choice to participate in secure behaviors or follow security policies [65], [66], [67], [68], [69], [70], [71], [72], [73], and [74].

Employees' acceptance is not only dependent on employees' perceived benefits, but is also impacted by employees' perceived concerns; Concerns about privacy and security BYOD are discussed by[75]. The assessment of concern in the circumstance of BYOD has been viewed little in the Information System (IS) research literature [32].

This research goal is to provide insight into the determinants of HCP decision to take part in BYOD, and impact of security and privacy on HCP intention to use BYOD. To the best of the researcher's knowledge, this study will be first to comprehensively examine the intention to adopt BYOD among HCP in Pakistan not only from a technological perspective as well as from behavioral perspective. The researchers proposed a conceptual model by integrating Unified Theory of Acceptance and Use of Technology 2 (UTAUT2), and Protection Motivation Theory (PMT) theories as the theoretical foundations for proposed model. Considering the specific attributes of BYOD,

the researcher proposes their conceptual research model as shown in Figure 1.

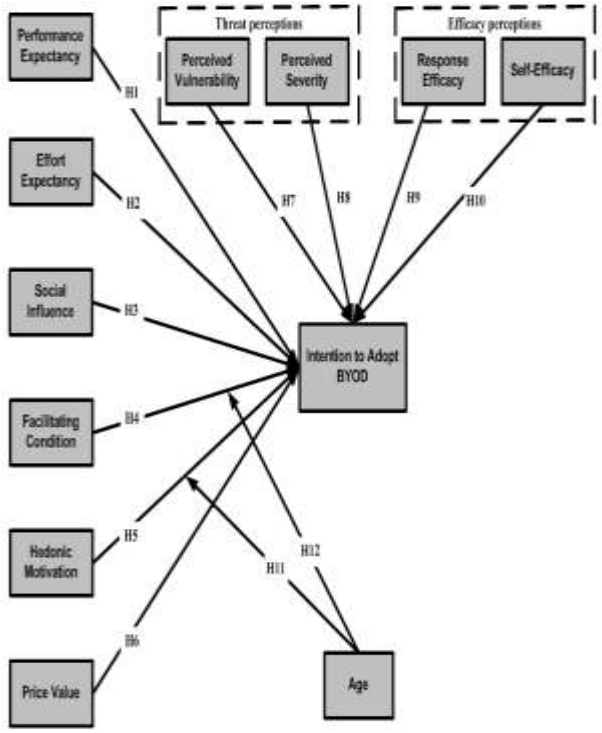

Figure 1 Proposed Conceptual Model

The basic objective of the present study is to investigate the intention to adopt BYOD, and to unveil those factors which influence the BYOD intention and privacy concerns related to HCP in Pakistan. Unfortunately, Pakistan faces short-staffed of different groups of HCP [76]. In this respect, the point of importance is whether the HCP intent to adopt BYOD or not, their decision would largely depend upon the security and privacy concerns.

4.0 CONCLUSION

Emerging technologies of mHealth like BYOD have the potential access to real-time information, and minimizing the wait time. In the literature review very few studies have used UTATU2 model for intention to adopt BYOD. This study will be first to comprehensively examine the intention to adopt BYOD among HCP in Pakistan not only from a technological perspective as well as from behavioral perspective. In this study, the researcher proposed the conceptual model for intention to adopt BYOD among HCP in Pakistan. Future research should aim to obtain more conclusive data.

References

[1] S. Jones and F. Groom, *Information and Communication Technologies in Healthcare*. 2012.

[2] X. Li, Y. Xue, and B. Malin, "Towards understanding the usage pattern of web-based electronic medical record systems," *2011 IEEE Int. Symp. a World Wireless, Mob. Multimed. Networks, WoWMoM 2011 - Digit. Proc.*, 2011.

[3] G. J. Putzer and Y. Park, "Are physicians likely to adopt emerging mobile technologies? Attitudes and innovation factors affecting smartphone use in the Southeastern United States.," *Perspect. Heal. Inf. Manag.*, vol. 9, p. 1b, 2012.

[4] NIH, "National institute of health." 2015.

[5] E. Sutherland, "Counting customers, subscribers and mobile phone numbers," *info*, vol. 11, no. 2. pp. 6–23, 2009.

[6] J. G. Kahn, J. S. Yang, and J. S. Kahn, "'Mobile' health needs and opportunities in developing countries," *Health Affairs*, vol. 29, no. 2. pp. 254–261, 2010.

[7] J. Keyes, *Bring Your Own Devices (BYOD) Survival Guide*, vol. 6, no. 13. 2013.

[8] R. L. Ponschock and G. F. Becker, "Digitation of society: The continuum to a speciation event," *Rev. Bus. Res.*, vol. 12, no. 5, pp. 118–130, 2012.

[9] Who, "Country Cooperation Strategy for WHO and Oman 2010–2015pdf," pp. 1–57, 2013.

[10] D. West, D. G. Branstetter, S. D. Nelson, J. C. Manivel, J.-Y. Blay, S. Chawla, D. M. Thomas, S. Jun, and I. Jacobs, "How Mobile Devices are Transforming Healthcare," *Brookings.Edu*, vol. 18, no. 16, pp. 1–38, 2012.

[11] J. Goedert, "Mobile device management software: the answer to BYOD?," *Health Data Manag.*, vol. 21, no. 2, pp. 32–34, 2013.

[12] R. E. Crossler, J. H. Long, T. M. Loraas, and B. S. Trinkle, "Understanding Compliance with Bring Your Own Device Policies Utilizing Protection Motivation Theory Bridging the Intention-Behavior Gap.," *J. Inf. Syst.*, vol. 28, no. 1, pp. 209–226, 2014.

[13] R. Pryss, N. Mundbrod, D. Langer, and M. Reichert, "Supporting medical ward rounds through mobile task.pdf.crdownload," *Inf. Syst. E-bus. Manag.*, vol. 13, no. 1, pp. 107–146, 2015.

[14] K.-W. Su and C.-L. Liu, "A Mobile Nursing Information System Based on Human-Computer Interaction Design for Improving Quality of Nursing," *J. Med. Syst.*, vol. 36, no. 3, pp. 1139–1153, 2012.

[15] G. Fitzpatrick and G. Ellingsen, "A review of 25 years of CSCW research in healthcare: Contributions, challenges and future agendas," *Computer Supported Cooperative Work: CSCW: An International Journal*, vol. 22, no. 4–6. pp. 609–665, 2013.

[16] J. Bardram and C. Bossen, "Mobility work: The spatial dimension of collaboration at a hospital," *Comput. Support. Coop. Work CSCW An Int. J.*, vol. 14, no. 2, pp. 131–160, 2005.

[17] A. S. Mosa, I. Yoo, and L. Sheets, "A Systematic Review of

Healthcare Applications for Smartphones," *BMC Med. Inform. Decis. Mak.*, vol. 12, no. 1, p. 67, 2012.

[18] J. E. Moyer, "Managing Mobile Devices in Hospitals: A Literature Review of BYOD Policies and Usage," *J. Hosp. Librariansh.*, vol. 13, no. 3, pp. 197–208, 2013.

[19] J. Sarasohn-Kahn, "How Smartphones Are Changing Health Care for Consumers and Providers," 2010.

[20] Y. Sun, N. Wang, X. Guo, and Z. Peng, "Understanding the Acceptance of Mobile Health Services: a Comparison and Integration of Alternative Models," *J. Electron. Commer. Res.*, vol. 14, no. 2, pp. 183–200, 2013.

[21] W. Andy, W. Xuequn, and G. Heiko, "IT CONSUMERIZATION: BYOD –PROGRAM ACCEPTANCE AND ITS IMPACT ON EMPLOYER ATTRAACTIVENESS," *J. Comput. Inf. Syst.*, vol. 56, no. 1, pp. 1–10, 2015.

[22] H. Bill and J. Brian D, *IT Manager's Handbook Getting Your New Job Done*. Morgan Kaufmann, Waltham, MA, 2012.

[23] J. A. Ingalsbe, D. Shoemaker, N. R. Mead, D. Shoemaker, and N. R. Mead, "Threat Modeling the Cloud Computing , Mobile Device Toting , Consumerized Enterprise – an overview of considerations Threat Modeling the Cloud Computing , Mobile Device considerations," in *Proceedings of the Seventeenth Americas Conference on Information Systems, Detroit, Michigan, AMCIS*, 2011, pp. 1–6.

[24] J. G. Harris, B. Ives, and I. Junglas, "The Genie Is Out of the Bottle : Managing the Infiltration of Consumer IT Into the Workforce," *Accenture Institute for High Performance*, no. October, 2011.

[25] S. L. Jarvenpaa, K. R. Lang, Y. Takeda, and V. K. Tuunainen, "Mobile commerce at crossroads," *Communications of the ACM*, vol. 46, no. 12. p. 41, 2003.

[26] G. Disterer and C. Kleiner, "BYOD: bring your own device," *Procedia Technol.*, vol. 9, pp. 43–53, 2013.

[27] R. Ballagas, J. Sheridan, and M. Rohs, "BYOD: bring your own device," 2004.

[28] Intel IT Center, "Insights on the Current State of BYOD," no. october, 2012.

[29] M. Loose, A. Weeger, and H. Gewald, "BYOD–The Next Big Thing in Recruiting? Examining the Determinants of BYOD Service Adoption Behavior from the Perspective of Future Employees," *Proc. Ninet. Am. Conf. Inf. Syst.*, no. June 2015, pp. 1–12, 2013.

[30] S. Alonshia and K. Ravikumar, "DEVICE MANAGMENT DESIGNED FOR LOSS OF VISIBILITY AND CONTROL USING BYOD," vol. 2, no. 10, pp. 1865–1867, 2013.

[31] I. Pogar, M. Gligora, and V. Davidovi, "BYOD : a challenge for the future digital generation," *Mipro 13*, pp. 748–752, 2013.

[32] B. Niehaves, S. Koffer, K. Ortbach, and S. Katschewitz, "Towards an IT Consumerization Theory: A Theory and Practice Review," *Eur. Res. Cent. Inf. Syst.*, vol. 13, 2012.

[33] M. R. Waterfill and C. A. Dilworth, "BYOD: Where the Employee and the Enterprise Intersect.," *Employee Relat. Law J.*, vol. 40, no. 2, pp. 26–36, 2014.

[34] J. Seigneur and P. Kölndorfer, "A Survey of Trust and Risk Metrics for a BYOD Mobile Worker World," *SOTICS 2013, Third Int. Conf. Soc. Eco-Informatics*, no. c, pp. 82–91, 2013.

[35] L. Hurbean and D. Fotache, "Mobile Technology: Binding Social and Cloud into a New Enterprise Applications Platform," *Inform. Econ.*, vol. 17, no. 2, pp. 73–83, 2013.

[36] B. Tokuyoshi, "The security implications of BYOD," *Netw. Secur.*, vol. 2013, no. 4, pp. 12–13, 2013.

[37] P. D'Arcy, "CIO strategies for consumerization: The future of enterprise mobile computing," *Dell CIO Insight Ser.*, pp. 1–15, 2011.

[38] K. J. Powers, "Handheld technology acceptance in radiologic science education and training programs," The University of West Florida, 2012.

[39] L. Sean, "Smartphones and tablets in the hospital environment," *Br. J. Healthc. Manag.*, vol. 18, no. 8, pp. 404–405, 2012.

[40] B. Ho, "Mobile's impact on hospital IT security in 2013: how your institution can adapt to BYOD," *J. Healthc. Prot. Manage.*, vol. 29, no. 2, pp. 120–124, 2013.

[41] O. F. Roca, "BYOD, gamification & high definition innovations for telemedicine," *CATAI Ed.*, no. November, pp. 12–17, 2012.

[42] K. Ortbach, "Unraveling The Effect Of Personal Innovativeness On Bring-Your-Own-Device (Byod) Intention – The Role Of Perceptions Towards Enterprise-Provided And Privately Owned Technologyies," *Twenty-Third Eur. Conf. Inf. Syst.*, pp. 1–17, 2015.

[43] S. Shakir, A. Ghazali, I. A. Shah, S. A. A. Zaidi, and M. H. Tahir, "Job satisfaction among doctors working at teaching hospital of Bahawalpur, Pakistan.," *J. Ayub Med. Coll. Abbottabad*, vol. 19, no. 3, pp. 42–5, 2007.

[44] K. Atif, H. U. Khan, and S. Maqbool, "Job satisfaction among doctors , a multi-faceted subject studied at a tertiary care hospital in Lahore," *Pak J Med Sci*, vol. 31, no. 3, pp. 610–614, 2015.

[45] H. Ashraf, N. Shah, F. Anwer, H. Akhtar, M. A. Abro, and A. Khan, "Professional satisfaction of family physicians in Pakistan--results of a cross-sectional postal survey.," *J. Pak. Med. Assoc.*, vol. 64, no. 4, pp. 442–446, 2014.

[46] K. AK, Q. R, A. M, F. Z, and K. NK, "Comparison of job satisfaction and stress among male and female doctors in teaching hospitals of karachi," *J. Ayub Med. Coll. Abbottabad*, vol. 16, no. 1, pp. 23–27, 2004.

[47] A. A. Malik, S. S. Yamamoto, A. Souares, Z. Malik, and R. Sauerborn, "Motivational determinants among physicians in Lahore, Pakistan," *BMC Heal. Serv Res*, vol. 10, no. 1, p. 201, 2010.

[48] R. Shawahna and N.-U. Rahman, "Prescribing Errors in Psychiatry Department: An Audit From A Hospital In Lahore," *J. Pakistan Psychiatry Soc.*, vol. 5, no. 1, pp. 31–33, 2008.

[49] T. Nation, "On Medical Errors," *The Nation*, 2009.

[50] A. A. M. Gadit, "Medical Errors: Who is to be blamed?," *J Pak Med Assoc*, vol. 62, no. 4, pp. 406–407, 2012.

[51] S. Hennessy, W. B. Bilker, L. Zhou, A. L. Weber, C. Brensinger, Y. Wang, and B. L. Strom, "Retrospective drug utilization

review, prescribing errors, and clinical outcomes.," *JAMA*, vol. 290, no. 11, pp. 1494–1499, 2003.

[52] M. Jenkison, "Prescribing Errors." pp. 256–259, 2002.

[53] N. M. A. LaPointe and J. G. Jollis, "Medication errors in hospitalized cardiovascular patients.," *Arch. Intern. Med.*, vol. 163, no. 12, pp. 1461–1466, 2003.

[54] B. Daniel and P. Maximilian, "Enterprise App Stores for Mobile Applications - Development of a Benefits Framework," in *Proceedings of the Nineteenth Americas Conference on Information Systems (Amcis), Chicago*, 2013.

[55] J. Nathan and J. K.D, "The Pathway to Enterprise Mobile Readiness Analysis of Perceptions, Pressures, Preparedness, and Progression," in *Proceedings of the Eighteenth Americas Conference on Information Systems, Seattle, Washington*, 2012.

[56] C. Moreno, N. Tizon, and M. Preda, "Mobile Cloud Convergence in GaaS A Business Model Proposition," in *Proceedings of the 45th Hawaii International Conference on System Sciences*, 2012, pp. 1344–1352.

[57] R. Weber, "Evaluating the Developing of Theories in the Information System Discipline," *J. Assoc. Inf.*, vol. 13, no. January 2012, pp. 1–30, 2012.

[58] J. Jaccard and J. Jacoby, *Theory Construction and Model-Building Skills: A Practical Guide for Social Scientists*. Guilford Press, 2010.

[59] V. Venkatesh, M. G. Morris, G. B. Davis, and F. D. Davis, "User acceptance of information tehcnology: Toward a unified view," *MIS Q.*, vol. 27, no. 3, pp. 425–478, 2003.

[60] V. Venkatesh, J. Y. L. Thong, and X. Xu, "Consumer Acceptance and Use of Information Technology : Extending the Unified Theory," *MIS Q.*, vol. 36, no. 1, pp. 157–178, 2012.

[61] S. A. Brown and V. Venkatesh, "A Model of Adoption of Technology in the Household: A Baseline Model Test and Extension Incorporating Household Life," *mis*, vol. 29, no. 3, 2005.

[62] R. W. Rogers, "A Protection Motivation Theory of Fear Appeals and Attitude Change," *J. Psychol.*, vol. 91, no. 1, pp. 93–114, 1975.

[63] J. E. Maddux and R. W. Rogers, "Protection motivation and self-efficacy: A revised theory of fear appeals and attitude change," *J. Exp. Soc. Psychol.*, vol. 19, no. 5, pp. 469–479, 1983.

[64] P. Norman, H. Boer, and E. R. Seydel, "Protection Motivation Theory," 2005. [Online]. Available: http://doc.utwente.nl/53445/1/K469____[1].pdf. [Accessed: 12-Dec-2015].

[65] C. L. Anderson and R. Agarwal, "Practicing Safe Computing: A Multimethod Empirical Examination Of Home Computer User Security Behavioral Intentions," *MIS Q.*, vol. 34, no. 3, pp. 613–643, 2010.

[66] R. E. Crossler, "Protection Motivation Theory: Understanding Determinants to Backing Up Personal Data," *43rd Hawaii Int. Conf. Syst. Sci.*, pp. 1–10, 2010.

[67] P. B. Lowry, R. E. Crossler, A. C. Johnston, Q. Hu, M. Warkentin, and R. Baskerville, "Future directions for behavioral information security research," *Comput. Secur.*, vol. 32, no. JUNE, pp. 90–101, 2013.

[68] T. Herath and H. R. Rao, "Protection motivation and deterrence : a framework for security policy compliance in organisations," *Eur. J. Inf. Syst.*, no. August 2008, pp. 106–125, 2009.

[69] P. Ifinedo, "Understanding information systems security policy compliance: An integration of the theory of planned behavior and the protection motivation theory," *Comput. Secur.*, vol. 31, no. 1, pp. 83–95, 2012.

[70] A. C. Johnston and M. Warkentin, "FEAR APPEALS AND INFORMATION SECURITY BEHAVIORS : AN EMPIRICAL STUDY," *MIS*, vol. 34, no. 3, pp. 549–566, 2010.

[71] Y. Lee, "Understanding anti-plagiarism software adoption : An extended protection motivation theory perspective," *Decis. Support Syst.*, vol. 50, no. 2, pp. 361–369, 2011.

[72] Y. Lee and K. R. Larsen, "Threat or coping appraisal : determinants of SMB executive's decision to adopt anti-malware software," *Eur. J. Inf. Syst.*, vol. 18, no. 2, pp. 177–187, 2009.

[73] H. Liang and Y. Xue, "Understanding Security Behaviors in Personal Computer Usage : A Threat Avoidance Perspective," *J. Assoc. Inf. Syst.*, vol. 11, no. 7, pp. 394–413, 2010.

[74] I. Woon, G. Tan, and R. Low, "A Protection Motivation Theory Approach to Home Wireless Security," in *Twenty-Sixth International Conference on Information Systems*, 2005, pp. 367–380.

[75] B. Lebek, K. Degirmenci, and M. H. Breitner, "Investigating the Influence of Security, Privacy, and Legal Concerns on Employees' Intention to Use BYOD Mobile Devices," *Amcis*, no. 2008, pp. 1–8, 2013.

[76] M. A. Abdullah, F. Mukhtar, S. Wazir, I. Gilani, Z. Gorar, and B. T. Shaikh, "The Health Workforce crisis in Pakistan: A Critical Review and the Way Forward," *World Heal. Popul. [Electronic Resour.*, vol. 15, no. 3, pp. 4–12, 2014.