Infrastructural Barriers to e-Health Implementation in Developing Countries:

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ABSTRACT
Infrastructure is the backbone of every CBIS irrespective of the field or organization. Digital technologies are not only expensive but also demand professionalism for successful execution of e-Projects. However the availability of basic infrastructure is indispensable. The research reports that infrastructural issues are dominating the research on e-projects in all organizations including health sector. This becomes more critical in the background of developing states like Pakistan. This paper aims at pinpointing the widely reported barriers to e-health projects emanating from the infrastructural availability and its maintenance with focus on developing countries.

Keywords: Internet, hardware & software, IT-professionals

1. Introduction

E-Health is the application of ICTs particularly internet for improving the healthcare services (Eng, 2004). Many developed nations have invested huge amounts of money on these systems and the developing states are also making efforts to adopt these technologies. However, there are several difficulties to be addressed before taking full advantage of these technologies (Chanda & Shaw, 2010). It is noteworthy that most of the studies about eHealth and its successful implementation have been undertaken in both advanced (Little et al., 2007; Eysenbach et al., 2007; Reichertz, 2006) and developing ones (Asangansi et al., 2008; Oak, 2007; Kimaro& Nhampossa, 2007; Omona & Ikoja-Odongo, 2006).

Several factors have been discovered as the important variables in defining the successful implementation of e-Health. However, the research indicates that

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'infrastructural arrangements' play central role and it becomes extremely important in the context of the developing states like Pakistan. According to Anwar et al., (2012) and Kundi (2010) the developing nations do not have adequate required infrastructure and professionals. So availability and effective use of ICT-Infrastructure is indispensable for successful adoption of e-health systems. The purpose of this paper is to discuss and review some existing research on the role of ICT-infrastructural components on e-health implementation.

2. Internet

Networking was the ground-breaking digital innovation which altogether modified the landscape for the use of ICTs. Computer is no more the central feature of computer based systems rather it is just a node on the network.

Internet is one of the convenient and cheapest sources that save time for searching information by the healthcare professionals. This is supported by (Mittman & Cain, 1999) they found that availability of online health care information save time, efforts and make the access easier. As according to Griffiths et al. (2006) one of the most common functions of internet is that it provides all sorts of health related information through use of different websites.

Before realizing the importance of internet for accessing healthcare information, there are some issues that must be addressed by the different nations particularly the developing states like Pakistan, for example, a poor Internet skills on the part of healthcare professionals prevent them to understand the difference between biased and unbiased information, to differentiate evidence-based claims, and to interpret the information which is meant for health professionals (Cline & Haynes, 2001).

Developing nations lack appropriate tools and /computer systems/utilities to access the relevant and quality healthcare information. Benigeri & Pluye, 2003) noted that few tools are available to help the users to find relevant information from the ocean of information available on different websites. They further added that health professionals lack the reading skills for reading technical terms on internet, while Hogan & Palmer (2005) are of the opinion that health care professionals lack the skill of processing the online health data thus spend too much time on the same.

One of the most common problems that exist among the healthcare professionals is that they lack the skills of handling different internet tools especially the browsers/search engines. According to Ivanitskaya et al. (2006) as internet search

engines help to identify huge health-related information yet, using such search engines requires training and specific skills of the users regarding internet tools. Appropriate technology along with training in health informatics must be provided to doctors and paramedics. According to Malik et al. (2008) sluggish internet use among doctors in Pakistan is due to unavailability of proper technology and lack of computer training. They further argue that although doctors have access to internet but they do not use it because of their belief that information available on internet is unreliable and of poor quality thus causing a slow use. The misconception among doctors about the reliability and quality of information on internet affects the performance of the doctors. The existence of misconception among doctors about the validity of information on internet adversely affects the performance of organizational members/doctors (Sajjad et al., 2010).

3. Hardware and software

Adoption of appropriate hardware & software are crucial for successful implementation of e-health systems. Before launching the e-projects, required hardware and software must be detected, ascertained and put in place in order to avoid users'-related problems. According to Kuhn et al. (2001), while at the onset of e-project, already available software & hardware must be identified as users often complaint that IS and interface designs are not user friendly. Further he adds that IS and the technology-ware, in health care institutions/organizations, lacks the flexibility and adaptability which create one of the many users' problems.

For success of e-health applications, the doctors must be given chance to work jointly with IT-staff to spell out their specific requirements affecting their tasks. According to Rhidian & Huges (2003) while designing and adopting technologies, users' (doctors) must be given chance to participate in IS-development proceedings as it improves system development and helps the users to determine the effects of the IS upon their work.

Doctors in low income countries complaint that the contents and the language of the software is not according to their native environment, Chetley et al. (2006) asserts that appropriate language is frequently neglected in IS and little content is available in local languages for e-health programs. For successful e-health applications, doctors and physicians from all different sections of a hospital must be considered while designing an IS as it improves the quality of the IS because as physicians from different sections of healthcare institution can provide complete requirements and thus unnecessary features of an IS could be avoided. Khoja et al.

(2007) is of the view that all healthcare providers must be involved in planning, development and implementation of new e-health interventions and their success.

4. IT-professionals

ICTs have impact on organizational work practices when people have the necessary capacity to use and maintain them. It is very common that IT-workforce in the hospitals of developing nations possess limited computer skills, they also lack the enthusiasm to learn IT-related skills and use the same while performing their different tasks. This may be due to un-conducive environments and lack of training resources and programs. According to Kimaro & Nhampossa (2005), to offset the issue of improper usage of IS/ICTs in health sector, training of IT-professionals about e-health systems is critical for sustainability and avoidance of failures regarding e-health projects in developing nations. The failure rate of e-health projects in developing countries is higher than in developed countries due to lack of proper IT-professionals and their knowledge about e-applications (Kundi, 2010). Indjikian & Siegel (2005) reports that lack of training and education of the IT-professionals in healthcare organizations compels IT-workforce to avoid the usage of e-health systems and thus resources are wasted without any benefits of IT-applications in health sector.

Majority of the healthcare organizations in developing countries possess huge information but lack the capability to manage and analyze the information by using ICTs for decision making. Therefore the users of e-health applications must be properly trained for the success of e-health systems. According to Chetley et al. (2006) ICTs are beneficial for healthcare sectors in developing states to effectively plan, control, and communicate health related information and decisions more successfully across all the different sections of a hospital. Likewise, they further opine that IT-professionals need training to effectively use all e-health applications.

Training enhances healthcare IT-professionals' knowledge and skills in e-health applications therefore training and learning programs for healthcare providers must be arranged on regular intervals/basis. According to Qazi & Ali (2009) training should be a regular feature and healthcare providers must be trained at least once a year. Furthermore during training programs, the importance of IS/ICTs must be stressed because trainees lack awareness about different aspects of IS in health sector.

Capacity development of healthcare providers via training in e-health applications and particularly the internet ensures more successful implementation of ICTs in health organizations. Researcher like, Asangansi et al., (2008) have identified that internet/ICTs training must be provided to doctors for better communication and

relationships with physicians of advanced nations via internet to conduct their healthcare practices in a perfect manner. Similarly, Qaisar & Khan (2010) argues that skilled IT-professionals are the important component for the effective use of ICTs in healthcare. Therefore training and development aspect of healthcare providers can not be neglected for success of e-health systems.

5. Discussion

The arguments based on data of this study reveals that doctors in developing states are not given the opportunity to take part in information system development proceedings therefore IS/ICTs lack the specifications that are according to the requirements of healthcare professionals (Rhidian & Huges, 2003). Although e-health systems in developing countries are not a novel concept to their psyche anymore but there is slow usage of internet among Physicians and doctors due to lack of the ability to read, understand and use various technical terms on internet (Hogan & Palmer, 2005). The above data also highlights that low usage of internet among healthcare professionals of low income countries like Pakistan in mainly because of inappropriate gadgets and lack of IS/ICTs training programs (Malik et al., 2008).

Healthcare professionals in developing states object that IS and especially the interfaces are not user friendly. Furthermore, e-health applications are rigid in nature therefore create users' related problems (Kuhn et al. 2001). The software in health organizations of developing nations lacks the contents in local languages for e-health programs (Chetley et al, 2006). E-health projects in developing countries usually fail due to lack of IT-professionals and their knowledge about e-health systems (Kimaro & Nhampossa, 2005). Whereas, IT-professionals need training to effectively use all e-health applications (Chetley et al, 2006). Thus, training should be a regular feature and healthcare providers must be trained at least once a year (Qazi& Ali, 2009).

The main theme of this paper is presented diagrammatically which shows interconnectivity of all the variables thus expressing the contents of the present study.
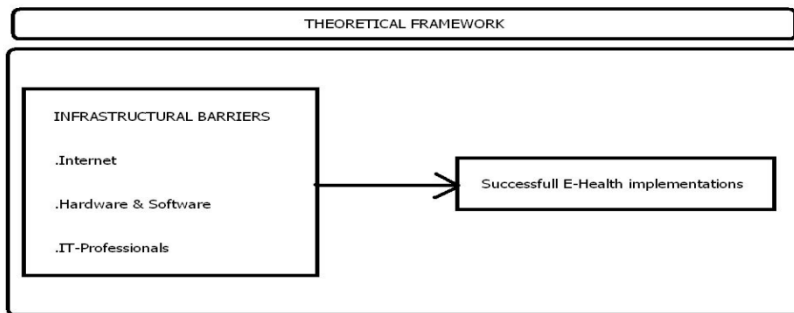
The above theoretical framework shows that the predictors (Internet, hardware & software and IT-professionals) explain the variation in the dependant variable. This model is the conceptual framework of the questions addressed in the current paper.

Conclusions

E-health is a newer platform for solving many unsolved health related problems both in the developed as well as developing counties. E-health systems have offered so many devices and tools that are being used by both developed and low income countries. Healthcare related IS and hardware is now easily available with affordable cost round the world.

However successful adoption of e-health systems depends on the infrastructural arrangements. The willingness and interest of healthcare professionals about the usage of e-health applications can be developed and maintained by providing appropriate tools and training on regular intervals for quicker access to information available on internet.

For tackling users' related problems and maintaining regular use of ICTs in healthcare organizations, physicians and doctors must be given chance of participation in information systems development process to incorporate the IS-contents according to their requirements. This way one can ensure the smooth and effectively implementation of the new system with minimum resistance and maximum acceptance of eHealth systems.

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