# DIGITAL PAKISTAN: OPPORTUNITIES & CHALLENGES

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## ABSTRACT

IT has revolutionized the social and organizational life around the globe. Given the newness of IT as a technology, there is a lot of potential that needs to be explored. It is however, argued that as IT can revolutionize the economic development, by the same coin, although its mismanagement in adoption process can end up in problems or even straight failure of the technology at the business-end. This study was conducted with reference to opportunities and challenges in the IT adoption process in Pakistan. The aim of the study was to point out the barriers that are impeding the country's computerization process in order to provide facts to the policy makers for smooth computerization. The primary data collected through structured questionnaires was analyzed and tested through correlation, regressions analysis and t-test. Out of 10 hypotheses, 3 were accepted while in the rest null hypotheses were not substantiated. Based on primary and secondary data analysis this study has found that all independent bureaucratic, political, education and social and cultural variables are mutually correlated and have significant impact on shaping and reshaping of IT in Pakistan, while the Pakistan IT policy is inconsistent, administrative machinery attitude is negative and non cooperative, procedures are cumbersome and implementation is weak and ineffective, not to mention the lack of IT knowledge on the bureaucratic side. The political environment is instable and law and order is worse which is discouraging the investment. Moreover, physical and legal infrastructure is insufficient and the country is lacking good quality IT professionals. IT organization alignment is another serious issue in Pakistan. However, government incentives and growing interest from the private sector indicate positive attitude towards computerization of the country.

**Keywords:** Computerization, Opportunities, Challenges, Bureaucratic, Political, Educational and Social Challenges

## 1. INTRODUCTION

A vision of "Wired Pakistan (widespread connectivity)" (Hussain, 2001) has become the buzzword among almost every literate and even illiterate Pakistanis as individuals, and offices are connecting more and more via Internet, which is being used as a status symbol. People talk about IT to learn more and, thus, be a part of the newly emerging 'cyber-community.' This trend is a potential indicator of enthusiasm among the people, which is undoubtedly a pre-requisite for establishing a knowledge base at the gross-root levels of a nation. It cannot however, be taken for granted because the risks involved in the IT-adoption process are evident from Sauer's findings (1999) which cause failure of IT projects. Thus, community's zest and zeal need to be administered at all the bureaucratic, political, educational and social levels and not only technological. In order for the progress to be reasonably oriented to the best possible developmental trajectory, both academic and practitioners research suggest that 'success' of an IS assumes much more than the successful development of a computer based system (Land et al., 1992; Avgerou and Cornford, 1993). IT diffusion in Pakistan demands certain situational arrangements, which initially, must satisfy the minimum requirements on all the bureaucratic, political, educational and social fronts (Korpela 1996; Raman and Yap 1996; Kalathil et al, 2001; Sturab and Hill 2001; Kundi, 2006). Otherwise, efforts on any front and inattention to other dimensions may end up in a mess or even if some achievement is obtained, it will be injustice not to think about the wastage caused by mismanagement. Research suggests that the discipline relating to the IT-adoption process "still lacks the detailed understanding of the nature, issues and factors affecting failure which would enable us to capitalize from experience and suggest more appropriate courses of action (Poulymenakou and Holmes, 1996)." Careful initial planning is required to prevent the chances of huge costs after implementation because it has been found that visibility into the possibility of IT failure does not emerge until the project is well under way (Glass, 1998a). This study was undertaken to understand the contextual background for computerization in Pakistan and to highlight the major challenges faced by public and private firms in IT adoption and to draw the attention of government to redress the issues hampering IT in the country. There is a scarcity of literature of this innovative technology in Pakistan, though studies were conducted in the developed world; unfortunately, very limited information is available about the impediments in adoption and growth of IT in Pakistan.

### 1.2. Computers in Pakistan

It has been almost 35 years since the computers first came to Pakistan when certain banks, PIA and WAPDA installed computers at their head offices. During the 1970s and the early 80s, import of computers was banned and one could not import a computer without the special import licence of the Ministry of Commerce. The restriction was eased in the mid 80s when the import of computer was put on free list. The import duties were also reduced and subsequently removed. In the 90s the market was flooded with the low-cost user-friendly PCs and that did not require rigid operating environments. This resulted in a sharp increase in the number of computers imported and installed. As a result of the government's liberal policies, this increase became exponential both government and private sectors. In March 2000, the government decided to set up the IT and telecom (for ICT) division to provide a focal point for IT at federal level (Khawaja, 2001). IT policy was announced in 2000, Electronic Transaction Ordinance was promulgated in 2002 and Electronic Crimes Act is approved by Cabinet in 2007. Since then, tremendous development activity has taken place in the IT sector in Pakistan. Pakistan has initiated revolutionary steps for the infusion of technology into different aspects of life. For example, Ministry of Science and Technology (MoST, 2007) Pakistan has been pursuing a hectic IT-development program for the last couple of years. Several task forces have been established to take care of the multiple areas of the technology and its continuing support to certain areas of life. There are task forces for e-Governance, e-Commerce and poverty alleviation and for 'women in IT' (Ara, 2001), however, several steps have to be guaranteed because "misconceived IT intervention" can generate considerable human resistance to change, (Kundi, 2007)" which further intensifies the non-technical problems of computerization.

Though Pakistan has made sustained efforts to bring its IT sector up to par with the other leading players, if compared to other countries, there is still a long way to achieve the desired goals. According to Table 1, adopted from Economist Intelligence Unit e-readiness rankings 2007, shows that out of 69 countries, Pakistan lies in the 67th position; its score increased from 3.03 in 2006 to 3.79 in 2007 which shows gradual progress (The Economist, 2007). Moreover, there is a huge gap between the developed and the developing countries especially in comparison to Denmark, US and Sweden, India, Sri Lanka, and Pakistan are far behind in the race of e-readiness for IT advancement.

**Table: 1** E-Readiness annual rankings 2007 (Source: Economist Intelligence Unit, 2007)

| 2007 e-readiness rank (of 69) | 2006 rank | Country | 2007 e-readiness score (of 10) | 2006 score |
|---|---|---|---|---|
| 1 | 1 | Denmark | 8.88 | 9.00 |
| 2(tie) | 2 | US | 8.85 | 8.88 |
| 2(tie) | 4 | Sweden | 8.85 | 8.74 |
| 54(tie) | 53 | India | 4.66 | 4.04 |
| 61 | 59 | Sri Lanka | 3.93 | 3.75 |
| 63 | 67 | Pakistan | 3.79 | 3.03 |
| 69 | 65 | Iran | 3.08 | 3.15 |

Likewise, Table 2 portrays the readiness of the developed countries with respect to connectivity and technology infrastructure, business environment, social, cultural and legal environment, government policy and vision, consumer and business adoption.

**Table2:** Overall score of Developed Countries for e-Readiness with reference to different factors (Source: Economist Intelligence Unit, 2007 )

| | Overal l score | Connectivity and technology infrastructure | Business envt. | Social and cultural envt. | Legal envt. | Government policy and vision | Consumer and business adoption |
|---|---|---|---|---|---|---|---|
| *Category weight* | | *20%* | *15%* | *15%* | *10%* | *15%* | *25%* |
| Denmark | 8.88 | 8.40 | 8.65 | 8.60 | 8.50 | 9.85 | 9.15 |
| US | 8.85 | 8.10 | 8.59 | 8.80 | 9.00 | 9.00 | 9.50 |
| Sweden | 8.85 | 8.60 | 8.40 | 8.20 | 8.50 | 9.70 | 9.35 |

In comparison to developed countries, the score given in table 3 points out that developing countries are lagging behind in the IT adoption race. Figures of table 3 portray that developing countries and especially the overall score of Pakistan is 3.79 as compared to Denmark 8.88, US 8.85 and Sweden 8.85, moreover, within the region, India and Sri Lanka are in better positions than Pakistan with reference to efforts standing on the overall score of 4.66 and 3.93.

**Table3:** Overall score of Developing Countries for e-Readiness with reference to different factors (Source: Economist Intelligence Unit, 2007)

| | Overall score | Connectivity and technology infrastructure | Business Envt. | Social and Cultural Envt. | Legal Envt. | Government policy and vision | Consumer and business adoption |
|---|---|---|---|---|---|---|---|
| *Category weight* | | *20%* | *15%* | *15%* | *10%* | *15%* | *25%* |
| India | 4.66 | 2.90 | 6.25 | 5.20 | 5.50 | 4.60 | 4.50 |
| Sri Lanka | 3.93 | 1.80 | 5.90 | 4.40 | 5.40 | 3.75 | 3.70 |
| Pakistan | 3.79 | 2.90 | 5.34 | 3.00 | 4.65 | 3.90 | 3.65 |
| Iran | 3.08 | 2.80 | 4.17 | 4.60 | 2.10 | 2.50 | 2.50 |

IT issues in Pakistan are varied enough; few are likely to be overcome in the near future and others are expected to remain over a much longer period. To help readers understand the nature of challenges to IT in Pakistan and give the ongoing importance of IT, it is equally important to study and review how to improve the IT adoption process in Pakistani organizations. There is, therefore, a strong need to conduct more studies of technology adoption especially in the area of public and private sector organizations. This study first reviews the major issues and then focuses specifically on how to solve them. Finally, it will describe some management implications for successful computerization.The rest of the paper is organized as follows: A review of previous research is followed by the theoretical framework to develop a model used in this study along with the justification to include in the study. This is followed by results and discussions. Clearly recognizing the factors that influence success or failure of IT in a developing country of South Asia, the paper concludes with suggesting strategies for successful implementation of IT in Pakistan.

**2. REVIEW OF THE PRIOR STUDIES**

Pakistan is faced with several challenges in IT adoption. The most significant one is that top managers in government organizations have a politicized role, which means that they must seek appropriations through political means, are appointed and serve at the pleasure of elected officials and must deal with political influences and the wants of multiple interest groups.

This means that government officials are much more concerned with policy agenda-setting processes rather than management functions (Caudle et al., 1991). Contrary to the increasing sophistication of information technology, "information systems continue to fail either during development or at the points of implementation and use (Poulymenakou and Holmes, 1996)." The IS failure is attributed to numerous factors where each one is competent enough to make or ruin an IS development project. The researchers have unveiled an array of human, organisational, environmental and technological reasons (Hirschheim and Schafer 1988; Mumford, 1991; Pimchangthong et al., 2003) that combine together and create a situation of failure. Despite huge research on IT-related problems, the IS failure "failure remains a problem world-wide (Kundi, 2006)." Most of the runaway projects are huge and there is multiplicity of causes. Many of the runaway projects were lauded in their history as being "breakthroughs (Glass, 1998b)." There is wide evidence that the success and failure of an IT infusion process significantly depends on the 'senior management's support' in any organization, public or private (Bronjolfsson, 1993; Kandelin et al., 1998; Kohli and Sherer, 2002). The same is arguable for a country like Pakistan, where the senior management (related to a political and bureaucratic structure such as, Ministry of Science and Technology [MoST]) and the IT Commission has to play a dominant role in making or ruining the IT strategies, which are initiated both at public and private levels of development. If there is a wider gap between what the senior executives are speaking in the language of 'official statements' and the practical happenings of the same, the

process of development is more likely to be pulled back instead of pushed ahead. The delay in the reform of our bureaucratic colonial structure is generating several side effects. Khan (2007) points that red-tapism and exhausting procedures to get any project approved in the name of 'registration,' for example, are the commonplace experiences of our nation in the adoption of any technology and IT is not the exception. IT education in the private sector, for example, is connected with the bureaucracy both for the opening of computer training institutions and state-monitoring of the performance of these institutions. "The typical assumption underlying the IS development process is that its goals are clear, unambiguous and non-conflicting. However, this rational approach neglects the problems of goal formulation which often involves negotiation and standard techniques of horse-trading, persuasion, bribes, threats, and management of information (Lyytinen, 1988)." Politics may be defined as the pursuit of interest in the face of scare resources. Political activity is frequently characterized by conflict resulting from competition for such resources (Korpela 1996; Miller, 1998). The resolution of such conflict may be characterized by negotiation and compromise according to the balance of power between the parties involved (Drummond, 1996). The political dimension in the development and implementation of IT projects has widely been explored (Markus, 1983; McGrath, 1997; Ewusi-Mensah and Przasnyski, 1994; Warne, 1997; Rodriguez and Wilson 2000; Kalathil et al, 2001; Kundi et al, 2007). There is consensus on the existence and the dominance of the role of the political pressures during an IS development and use; however, debates are going on among the research community about how far political factors affect the process and how they can be declined to the positive stance (Flowers, 1997). Developed countries are enjoying leading edge technologies, tailored made systems besides the high level of the IT maturity organization. Although political conflicts in IT projects exist they are better managed because of their organizational IT maturity (Kundi and Nawaz 2006). Yet, in developing countries, particularly those which are still in the clamps of colonial legacies, in terms of obsolete political, official, legal and educational infrastructures and rules of business. Pakistan is not the exception, sometimes an uneducated is surprisingly appointed as the political head of the Ministry of Education (Khan, 2007). However, the problem does not stop there; it extends down to the bottom of the government machinery, for example, the lack of IT-related knowledge on the part of decision makers at different levels of government hierarchy is resulting in the wastage of precious resources (Kelgai and Middleton, 2003). It might be assumed that political illiteracy reduces with the development of IT in the country; however, political literacy affects the IT-adoption process (because political heads are the decision makers in the national computing programs). Therefore, a proactive approach to acquaint the political leadership with the pros and cons of IT, with particular emphasis on IT administration at national and institutional levels, can ensure less wastage of resources and, thus, higher rates of progress. IT rarely acts as a malleable and free commodity because: 1. the switching costs are high; 2. organizational politics may restrict available choices to inappropriate ones; and 3. users (and even analysts) may set unrealistic expectations to technology due to bias, difficulty in evaluating its functionality, or just inexperience, laziness, or lack of time (Lyytinen, 1988).The information systems are by any measure one of the most complex artefact that human beings have ever created and the complexity very often exceeds the understanding of all concerned (Lyytinen, 1988). Therefore, emphasis on the technological education is logical in the sense that the greater the understanding of the technological options, the greater will be the chances of mature computerization (BEI 2004; Taifur 2004). Today Pakistan stands at the "crossroads after realizing a little late [for example, in comparison to India] in the fame of IT that an illiterate population does not and cannot synchronize with the objectives of economic growth and foreign investment" (Hussain, 2001; Mujahid, 2002). Given the traditional model of our educational system, there are several weaknesses, which pose serious threats to the IT education and development in the country. At the moment, for example, most

of the IT-educated products of these institutions are appearing incompatible with the market demands (Rice, 2003; UN, 2004; Kundi, 2006). It is not argued that these should not happen because some degree of failure is acceptable as a price of the learning process however, if problems are emerging from the mismanagement, it is unlovable without developing an adequate IT-management strategy.The most striking effect on the life of educated class in Pakistan is being made by the privately managed computer training institutions, which are opening in every nook and corner of the country under multiple names and titles. The educated community, which is, however, not computer-literate, cannot help getting at least acquainted with the computer. So they are easy prey for the training institutions where, "despite having an undesirably low qualification, teachers in many of the IT institutions are given the responsibility of shaping the minds of the future generations in the advanced field of IT" (Aslam, 2001; Bushra, 2002; Mateen, 2006). Since the trainees are ignorant of computer applications, therefore, what is being taught and how competent the trainer is become irrelevant questions – but that is the source of the problems. It is the government's responsibility to so regulate the private education that at least the teacher's competence and the compatibility of the courses with the current market demands are ensured. Thus, in order to compete in an ever-changing environment. the methods of learning and teaching need to be redressed completely and must focus on techniques that help in coping with professional demands. Several press reports and research articles are unfolding problems related to the educational system and their deliverables. There have been many reports of fraudulent practices by the so called computer training institutions particularly, through the high-pitch advertisements for generating hype about IT. The advertisements contain enough information about IT, but very little and ambiguous information about how a particular course on IT will change a learner's life. "95% of the so called IT education centres that have mushroomed in Pakistan over the last couple of years are providing nothing but hard cold cash to the owners and nothing else (Hussain, 2001; Kundi, 2006). Aslam (2001) notes that the major issues for IT-education in Pakistan are:

1.  The quality of teaching. It is no secret that Pakistan, today, is short of qualified people who could impart quality training at the IT institutions. The phenomenon of massive and unrestricted brain drain has compounded this problem.
2.  Lack of uniformity in the courses offered by the so called IT institutions.

The social factors include the belief and expectations of the IT users who consider IT as panacea for all management problems. In the development of IT projects, the stakeholders are usually highly uncertain of how IS interacts with their going concerns and how features of IS are to be seen as problems (Lyytinen, 1988). Therefore, users hold unrealistic expectations about a system (Keil, 1995). Due to the technological hype by the IT-vendors, several misperceptions have been established for example, most of the organizational workforce considers IT as a 'silver-bullet,' which can solve any organisational problem (Navareete and Pick, 2003; Hageenaars, 2003; Kundi, 2006). This type of thinking is common not only among users but also among system developers. The developers however, are responsible for creating and enhancing unfounded expectations from the IT solutions. Lyytinen (1988) suggests that the problems of computerization are dynamic due to the influence of two factors:

1.  IT brings changes in the organisational structures, procedures, culture and the external environment. For these reasons, IS can become unfit to stakeholders' expectations;
2.  IS expectations change due to organisational learning, persuasion, political skills of some key persons and so on.

**Research Model and Inclusion of Research Variables**

The existing literature review and previous studies on the usage of computers in the organisational environment provides enough background to develop a research model on the basis of which a one-stage normative model is developed, which provides basis of the research objectives This model, shown in Figure-1, is a one-stage model which relates the independent and dependent variables without any intervening variables. The relationship as indicated in the model is associative and casual in nature. In this study, computerization is dependent variables and there are four independent variables. The four independent variables emerged from literature are 'bureaucratic', political', 'educational', and 'social' factors ''. The schematic diagram of the theoretical framework of this research is illustrated and detailed justification for the inclusion of each independent variable in the model is given below:
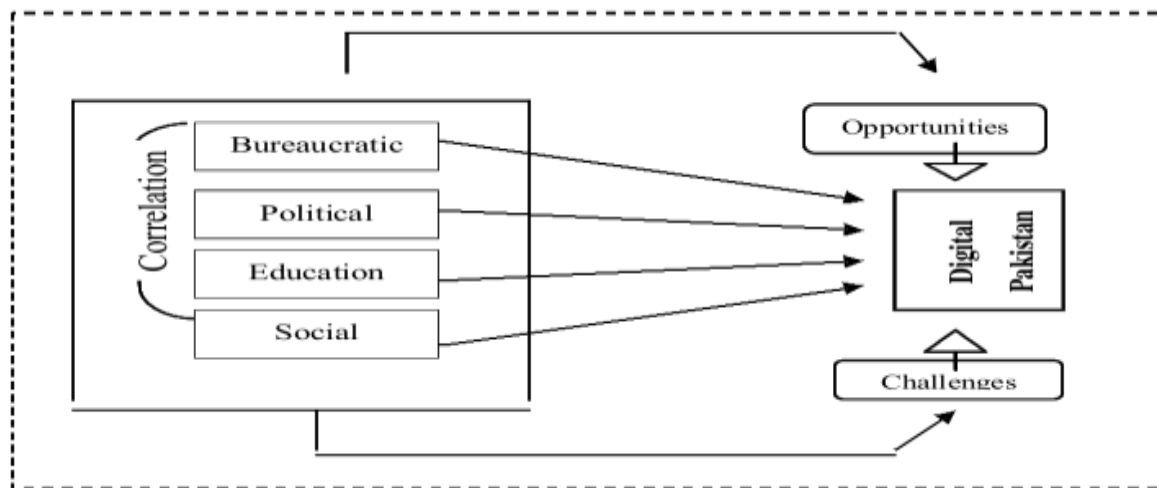


**Figure1:** Schematic Diagram of the Theoretical Framework

**Bureaucratic Issues**

The administrative machinery of the country plays a key role in the success or otherwise failure of the computerization process. The major issues include the negative and non-cooperative attitude and poor support for implementation of the IT policies besides cumbersome procedures and lack of IT know-how on the part of bureaucracy. This is supported by the studies for example (Argyris and Schon, 1978; Kandelin et al., Bronjolfsson, 1993; 1998; Hussain, 2001; Aslam, 2001; Higgo, 2001; Kohli and Sherer, 2002; Pimchangthong et al., 2003; Checchi et al, 2003; Kundi, 2006; Kundi and Nawaz, 2006; Kundi et al., 2007; Khan, 2007). Moreover, the development of sufficient infrastructure for online transactions and eGovernment needs both physical and legal infrastructure which again depends on the interest and enthusiasm of government officials who provide funds for the development of physical infrastructure and regulate legal infrastructure (Joseph, 1995; Kundi, 2006). Based upon the review of previous studies, we propose the following hypotheses:

H1:Public sector says that bureaucracy is playing a positive role in the promotion and development of IT in Pakistan than the views of the private sector.

H2: Government IT-policies significantly influence the national pattern of IT Growth process in the country.

H3: Private sector is of the view that Government IT policies are inconsistent for IT promotion than the view of public sector.

**Political Issues**

The political stability of the government ensures peaceful and conducive political environment for successful computerization in the country, this further encourages the foreign investment and business activities to grow. Jenster (1987) Palvia et-al. (1990) and (Khan, 2007) argue that stability of political environment and peaceful law and order encourage investment in all sectors including IT. Anandarajan et al. (2002) and Scupola (2003) shared the same view and points out that governmental intervention both in terms of influence and regulation plays a significant role in the development of an environment conducive for implementation of IT policies. Moreover, within the organisation there are political conflicts between the developers and users in information system development due to IT organisation immaturity. These are significant factors and considered by several studies as if not addressed properly may hamper the computerization process and results into failure of computerization process. Following studies considered it a key success factor in computerization in developing countries (Markus, 1983; Jenster, 1987; Ewusi-Mensah and Przasnyski, 1994; Korpela 1996; McGrath, 1997; Warne, 1997, Flowers, 1997; Palvia et al., 1990; Rodriguez and Wilson 2000; Kalathil et al, 2001; Kelgai and Middleton, 2003; Kundi, 2006). Based upon these pervious studies, we propose the following hypotheses:

H4: Public sector is of the view that political environment is stable and playing a key role in the development of IT in the country than the views of the private sector.

H5: Political stability of the government itself reflects in either reinforcing or threatening IT in Pakistan.

H6: Management perceives a gap between users and developers due to organisational IT immaturity than IT Professionals.

H7: Politics in IT projects is impeding the growth and development of IT in the country.

**Educational Issues**

Education is considered as the backbone of modern economies which plays a significant role in IT diffusion (Cohen and Lavinthal, 1990). In Pakistan less attention has been paid to the

education sector while higher education is the most neglected one. Province wise literacy data for PSLM (2005-06) as against PIHS (2001-02) show Punjab to be on the top (56% Vs 47%) followed by Sindh (55% Vs 46%), NWFP (46% Vs 38%) and Balochistan (38% Vs 36%). Nationally, the GER for the primary school (age 5-9 years) has been recorded at 87 % in PSLM 2005-06, an increase of 15 percentage points from PIHS (2001-02). A substantial increase in female gross enrolment rate (61% to 80%) is one of the main reasons for the rise in GER. Province-wise, as well, increased GER were recorded for all the four provinces with the maximum increase being recorded in Punjab and then Sindh. Similarly, GER at the middle school level, 13-14 years old, has increased from 41 % in 2001-02 to 49 % in 2005-06, with the highest GER being a record in NWFP (38% to 52%). The Net Enrolment Rate (NER) for the primary schools was 42% in 2001-02 which increased significantly to 52 % in 2005-06. Overall, both the sexes have recorded a 10 percentage point increase in 2005-06 compared to 2001-02. Punjab (57%) is ranked on the top followed by Sindh, NWFP, and then Balochistan (PIHS 2001-02, PSLM Survey 2004-05 & PSLM 2005-06, PES, 2007-2008). The computer and information literacy play a meaninful role in the diffusion and acceptance of IT in the organisational structures. Several failure stories in developed and developing countries unearth the basic fact that the lack of IT education by the government officials' causes' unplanned and unorganized computerization besides miscommunication and misperceptions among the different parties involved in the development, implementation and use of the IT projects. Moreover, sometimes IT is considered as a threat to social and economic positions of the employees thereby resistance appears in the form complaints against IT by the organizational stakeholders who slow down and often impede the computerization. Hussain (2001), Aslam (2001), Mujahid (2002), Rice (2003), UN (2004), BEI (2004) and Taifur (2004) stresses on the IT education so that it paves way for smooth adoption of the IT. Likewise, quality of IT professionals is also a significant factor as used by the (Mumford, 1991; Dudeja, 2001; Kundi, 2006). Base upon the above we propose the following hypothesis:

H8: Lack of uniformity in courses, out-dated curricula and poor faculty are barriers to computerization in the country.

H9: Health sector is of the view that quality of the IT professionals is poor and are incompetent to the meet the national IT requirements.

**Social Issues**

Social factors, beliefs and expectations are considered by Lyytinen (1988) and Keil (1995) as important factors for successful computerization, while Morrison and Wise (2000), Navareete and Pick (20030 and Hageenaars (2003) argue that social factors are the most significant success determinants or otherwise failure as belief, expectations, culture and value vary from setting to setting, so detailed analysis of the social and cultural factors help the management how to successfully undertake IT projects. Moreover, Turban et al (2004), Kundi (2006) share the same views. Based on the previous studies we propose the following hypotheses:

H10: Employees resist as it is perceived by employees as threat to their economic and social status in the organizations.

**3.RESEARCH DESIGN**

**Design of Instrument**

From the review of the literature, an instrument was developed with the aim of covering the basic research objectives. A questionnaire with 50 questions after operationalization was developed based on nominal and Likert scale. Part 1 captured data about the demographic profile covering organizational characteristics such as, name, nature, type, sector, IT experience, users, developers and size of the organizations, while part 2 consists of the questions measuring the major variables on Likert scale.

**Instrument Reliability and Validity**

Several techniques were used to assess the Cronbach's (1971) coefficient reliability (face construct and convergent validity). In order to assert face validity, an initial questionnaire was passed through routine editing, then, it was handed over to the experts panel (academicians, practitioners and business managers). They were asked to respond to the questionnaire and, based upon their comments the questionnaire was reordered to enhance clarity, thereafter, a pilot study was undertaken to further test the instrument. Table 4 shows the reliability coefficients and convergent validity for the various constructs.

**Table 4:** Reliability and validity analysis

| Constructs | No of Items | Alpha value (.60 & above) | Mean | Variance explained (0.50 & above) |
|---|---|---|---|---|
| Bureaucratic | 4 | 0.87 | 4.33 | 0.58 |
| Political | 4 | 0.88 | 3.76 | 0.76 |
| Educational | 5 | 0.64 | 3.49 | 0.73 |
| Social | 3 | 0.75 | 3.52 | 0.65 |
| Computerization | 5 | 0.81 | 3.95 | 0.72 |

The closer the reliability coefficients get to 1.0, the better, however, the generally agreed upon lower limit for Cronbach's alpha is 0.7 (Robinson, et al., 1991), although it may decrease to 0.6 in an exploratory research (Robinson et. al., 1991; Hair et al., 1998). Nunally (1967) suggested that the score for each construct should be greater than 0.6 for it to be reliable. Hence, a score of 0.64 and above were accepted in this study. In general, validity refers to the degree to which an instrument truly measures the constructs that are intended to be measured. There are several types of validity however; Campbell and Fiske (1959) propose two types of validity: convergent and discriminating validity. The convergent validity is measured by average extracted for each construct during the reliability analysis that should be 0.5 or 50% of better (Igbaria and Iivari, 1995). Table 6 shows that all the constructs do have a considerable validity support. To further analyze for discriminating validity of these five constructs, the principal component method with varimax rotation was used to assess the variance explained. Testing discriminant validity required checking the cross loading of items on multiple factors. Table 5 shows all items loaded highly on their associated constructs but not other thus showing sufficient discriminant validity.

**Table 5:** Rotated component matrix of all constructs (Varimax factor loadings)

| Items | Factor1 | Factor2 | Factor3 | Factor4 | Factor5 |
|---|---|---|---|---|---|
| BCT1 | 0.84 | | | | |
| BCT2 | 0.91 | | | | |
| BCT3 | 0.63 | | | | |
| BCT4 | 0.81 | | | | |
| POL1 | | 0.67 | | | |
| POL2 | | 0.73 | | | |
| POL3 | | 0.67 | | | |
| POL4 | | 0.70 | | | |
| EDU1 | | | 0.82 | | |
| EDU2 | | | 0.73 | | |
| EDU3 | | | 0.68 | | |
| EDU4 | | | 0.74 | | |
| EDU5 | | | 0.83 | | |
| SOL1 | | | | 0.83 | |
| SOL2 | | | | 0.64 | |
| SOL3 | | | | 0.81 | |
| DIG1 | | | | | 0.69 |
| DIG2 | | | | | 0.83 |
| DIG3 | | | | | 0.70 |
| DIG4 | | | | | 0.81 |
| DIG5 | | | | | 0.83 |

**Sample Population**

The sample population of this study includes educational and health institutions from public and private sector in DIKhan and Peshawar. The technical distribution of the total population is given in the table 6, which shows the total number of each population category (N) along with its % in the total population:

**Table 6:** Sample Population from DIKhan & Peshawar

| | Sector | Organization | DIK | Peshawar | N |
|---|---|---|---|---|---|
| 1 | 3.2 Health | Public | 387 | 591 | 978 |
| | | Private | 192 | 409 | 601 |
| 2 | 3.3 Education | Public | 689 | 976 | 1665 |
| | | Private | 199 | 531 | 730 |
| | **Total** | | 1467 | 2507 | 3974 |

**Sampling Procedure**

Simple random and stratified sampling procedures were used to determine overall sample size and its area-wise and sector-wise samples. Table 7 gives the details of these applications.

**Table7:** Sample Size

| Sample (FINITE population) | | Stratified Samples | | | |
|---|---|---|---|---|---|
| **Pilot Study Statistics** | | **Pilot Study Statistics** | | | |
| Standard Deviation ( ) | 0.74 | Health (public) Peshawar | 591 | 0.7 | 33 |
| Standard Error (E) | 0.092 | Health (public) DIK | 192 | 0.89 | 14 |
| Z value at 95% Confidence | 1.96 | Health (private) DIK | 409 | 0.67 | 22 |
| Sample Population N | 3974 | Health (private) Peshawar | 689 | 0.66 | 36 |
| Target Population | INFINITE | Education (public) DIK | 976 | 0.67 | 52 |
| Sample Size | **234** | Education (public) Peshawar | 199 | 0.72 | 11 |
| | | Education (private) DIK | 531 | 0.8 | 34 |
| Formula | | Education (private) Peshawar | 480 | 0.8 | 31 |
| $n = [\sigma^2/(( E^2/Z^2)+(\sigma^2/N))]$ | | **N =** | **3974** | **n =** | **234** |
| | | Formula | | | |
| | | $n_a = [(nN_a\sigma_a)/((N_a\sigma_a)+(N_b\sigma_b)+(N_c\sigma_c))]$ | | | |

**Data Collection**

The literature survey and questionnaire were used for secondary and primary data collection. A pilot study as conducted, which helped in optimizing the 'constructs' used to measure the variables. It also assisted to develop a structured questionnaire as the main instrument for collecting primary data.

**Data Analysis Tools**

Given the nature of data for this study, both descriptive and inferential statistical tools were applied for data analysis, exploration of the findings and hypothesis testing etc. In particular, correlation and regression analysis and tests of significance (t-test.) were used to test hypothesis. Theoretical framework and hypotheses were developed from four independent variables, 'bureaucratic', political', 'educational', 'social', and the dependent 'digital Pakistan' variable emerged from the literature review. A questionnaire based on nominal and continuous scale was constructed after operationalization. The inter-item consistency (Cronbach's Alpha reliability coefficient) of the 5 independent and dependent variables was above .8, the closer the reliability coefficients get to 1.0, the better. As the Cronbach's Alpha for all the 5 items used in this study is about .847, thus internal reliability of the measures used in this study is considered to be good. Descriptive statistics for the computed variables were calculated and shown in table 8.

**Table 8:** Descriptive Statistics for the Computed Variables

| Items | Mean | Std. Dev |
|---|---|---|
| Bureaucratic | 4.10 | .54 |
| Political | 3.77 | .42 |
| Educational | 3.56 | .40 |
| Social | 3.41 | .37 |
| Computerization in Pakistan | 3.59 | .64 |

**Results of Hypothesis Testing**

Based on the problem statement, literature survey and theoretical framework, 10 hypotheses were developed and tested. To test the significance of mean differences, t-test was applied. The regression analyses were used to carve-out relations between the research variables. Out of 10 hypotheses, 3 H0 were accepted while in remaining tests, Null hypotheses were rejected. All differences described are significant at the p.

**Regression Analysis**

Table: 9. Correlation & Regression analysis for independent variables "Bureaucracy, Political stability, Govt-IT policy, Lack of uniformity of courses and poor faculty", and dependent variable "Digital Pakistan."

| Statement | Regression Analysis | Results |
|---|---|---|
| H$_2$. Government IT-policies have no significant Influence on the national pattern of. IT-growths | Simple Liner regression was used. Beta .427 is significant on 5 point scale at .003a level | Rejected |
| H$_5$. Political stability of the government itself does not reflects in either reinforcing or threatening the IT in Pakistan. | Simple Liner regression was used. Beta .521 is significant on 5 point scale at .038a level | Rejected |

H7. Politics in IT projects is impeding the Simple linear regression was used. Accepted the growth and development of IT in Beta .631 is significant on 5 country. point scale at .000a level.

H8. Lack of uniformity in courses, out-dated Multiple regressions were used. Beta score Accepted curricula and poor

faculty are barriers to .428, .365 & .704 on 5 point scale at .000a computerization in the country. level

H10. Employees do not resist Multiple regression was used. Beta score Rejected as IT is not perceived by employees as a .371 and .622* on 5 point scale at .002a level. threat to their economic and social status in the organizations.

**Table10:** T-test comparisons to the Role of Bureaucracy, Consistency of IT Policy, Political Stability, Economic & status threats and Quality of IT professionals for computerized Pakistan with Group-1(Public) Group-2 (Private) and Group-1 (Health) Group-2 (Education).

| Statement/Hypothesis | Groups | Group 1 Means | Group 2 Mean | t-Score | Results |
|---|---|---|---|---|---|
| H$_1$. Role of bureaucracy in promotion of IT | Public/Private | 2.45 | 1.21 | 13.49 | Rejected |
| H$_3$. Consistency of IT Policy | Public/Private | 3.21 | 2.14 | 14.39 | Rejected |
| H$_4$. Political instability | Public/Private | 3.63 | 2.93 | 15.09 | Rejected |
| H$_6$. Users' developers gap due to IT immaturity | Mgt/IT-Prof. | 3.44 | 3.01 | 11.71 | Rejected |
| H$_9$. Quality & competency of IT Professionals | Health/Education | 3.00 | 2.04 | .441 | Accepted |

($p < 0.05$)=1.96

Scale: 1=Strongly agree, 2=Agree, 3=Neutral, 4=Disagree, 5=Strongly Disagree

**FINDINGS OF THE STUDY**

Theoretical framework based on literature was used to get readings from the real-world situation. Primary data collected through questionnaire provided enough material about the problem-situation in the background of ideal theoretical framework extracted from the documented knowledge. The analysis and logical reasoning of the primary and secondary data provides good base for the following findings of the study:

The data portrayed that 28% organizations surveyed were from public and 72% belong to private sector. 28% respondents represents the health sector and 72% of the respondents belong to education sector. Moreover, 28% of the organizations are using Pentium 3 computers while 72% have been found with Pentium 4. Similarly 51.5% of the organizations were using

home-made, 23.75% off-the-shelf and 24.75% other software. Furthermore, respondents in these organizations include 51.25% developers and 48.75% end-users, data showed that 47.75% of the organizations were using IT at TPS, 29% at MIS and only 23.25% use IT as strategic tool at SIS levels. Moreover, all independent variables i.e. bureaucracy .816**, political, .753** education .571 & social .693** significant at .001 level were found mutually correlated. The results of the regression reveals that computerization depends, for its promotion, on the administrative machinery while political stability in the country is threatening computerization, similarly lack of uniformity of courses, outdated curricula and poor faculty are the barriers to IT education in Pakistan. The Beta score, .633 for bureaucracy on a 5-point scale is significant at .000a, and Beta for political instability is .521 at .038a while Beta score for uniformity of courses is .428, outdated curricula .365 and poor faculty .704 is significant at .000a level, which indicate their influence that

these are the more influential and determining factors than the other variables of the study.

1. The IT policy of Pakistan does not meet the requirements of the IT industry as well as IT diffusion in the country. It is inconsistent and bureaucracy in the country misuses its powers and abuses the authority. Their attitude is negative and non cooperative. The procedures are cumbersome and unfriendly, policy implementation is weak and ineffective, while government functionaries lack IT know-how. Bureaucracy is not playing a promoting role for IT and imposing attitude of government officials resulted in a gap between the expectations and the outcomes among the stakeholders as government's policies neither accommodates the needs nor reflects the aspirations of the IT beneficiaries.

2. The 2nd finding of the study is that in Pakistan, the political environment is weak and instable, law and order is poor and turbulent, which is discouraging the investors to invest aggressively in the IT sector. Moreover, IT policy has failed to achieve development goals of sound physical and legal infrastructure because high bandwidth cost, slow and poor Internet speed, frequent disconnections due to faulty cables and inconsistency of electric power, besides insecurity in eTransactions are barriers to computerization in Pakistan.

3. The country lacks good quality IT institutes along with modern curricula; that is why quality of IT and management graduates do not match the organizational requirements. This study further reveals that the faculty hired in the IT institutions is poor and supervision on the part of government is weak.

4. Several organizations in the public and private sectors are now reaping the benefits of IT and many more are still infusing IT in their structures and work environment, however, due to low literacy and especially computer and information literacy, people are still hesitant to welcome IT. They consider it a major economic and social threat, so IT organization alignment is one of the serious issues for computerization in Pakistan.

5. Yet, one of the significant aspects of the study is that it finds that the environmental conditions in Pakistan are improving gradually, and the IT sector has more opportunities to grow due to government incentives and concessions on IT related equipment and software besides the growing interest of the private sector which, instead of poor political environment, is investing in computerizing their organizations. Similarly, the move towards eGovernment is a promising sign for the future of IT in the country.

## DISCUSSION

Jamil (1989) and Ashraf (1990) has identified low literacy of the bureaucracy with respect to the level of awareness about IT, lack of reliable and cost effective telecommunication service, lack of the required expertise due to insufficient training, poor updating skills and over emphasis on the highly formalized and centralized structures as major issues for computerization in Pakistan. Ahmad (1994) notes that highly inadequate IT education, lack of needed IT know-how regarding users and developers and lack of a broader understanding of the IT use due to lack of proper training and education causes failure of IT utilization efforts in the country. Bureaucracy is the most efficient instrument upon which success of computerization depends (Argyris and Schon, 1978; IT policy 2000; Hussain, 2001; Aslam, 2001; Higgo, 2001; Khan, 2007) yet the results in table 9 points that in Pakistan the role of bureaucracy is negative and non cooperative. The inconsistency of IT policy remained a

distinct problem because of the political upheavals and instability where government IT policies determines the national pattern of IT growths and success of computerization (Checchi et al , 2003; Kundi, 2006; Kundi and Nawaz, 2006; Kundi et al., 2007). In Pakistan due to inconsistent policies and high uncertainty, the pace of IT is slow, as shown in tables 9 and 10, this validates the expert's views. Political stability and peaceful law and order is necessary for investment and promotion of IT (Markus, 1983; Jenster, 1987; Ewusi-Mensah and Przasnyski, 1994; McGrath, 1997; Warne, 1997, Flowers, 1997; Palvia et al., 1990; Kundi, 2006) while results in table 9 indicates that frequent turmoil and political instability are impeding efforts in the country and the results in table 10 further strengthen this view. Likewise,a significant aspect of IT-policy should be the development of basic infrastructure because the IT growth depends on sound infrastructure (Joseph, 1995; Kundi, 2006). Though availability of h/w and off-the-shelf s/w is not the major issue in the country, the physical infrastructure to support IT is insufficient, ( for example, low bandwidth and inconsistent supply of power). Moreover, due to insufficient technical and legal infrastructure, eTransactions are insecure. This supports Rana (2006) who claimed 80,000 to 1, 00,000 daily attacks on PCs in Pakistan. The development of human resources is the prerequisite of IT and it should be the main focus of the IT policy (Dudeja, 2001; Kundi, 2006b), while Pakistan lack qualified IT professionals due to lack of coordination between government, IT institutes and IT industry. Researchers suggest computer and information literacy both for the developers and users which determine their IT-maturity, attitude of system users and success of computerization (Lyytinen, 1988; Keil, 1995; Morrison and Wise, 2000; Turban et al, 2004; Kundi 2006). Yet in Pakistan, the lack of uniformity in courses, out-dated curricula, poor faculty and lack of check on the part of government in regulating and governing the IT education institutions are impeding the IT efforts in the country. The results in table 10 strengthen this view which set guidelines and priority list to the decision makers of the country. Likewise, scores in table 10 unearthed that currently the quality of IT graduates is poor and they are unable to keep on updating their systems. Similarly, IT education helps in IT organizational maturity which is a prerequisite for the successful computerization (Mumford, 1991); however, results in table 10 reveal that due to poor IT education the organizations are still immature in exploring the potentials of IT for strategic use, while, results in table 10 show that employees in organizations consider IT as an economic and status threat.With this background, despite the challenges, the potential for coping with the demanding situation is not uncommon for the Pakistani community. Since its independence, the nation is taking major developmental leaps (the title of 'atomic power,' is one of the examples), in the face of many challenges like internal political breakdowns, political and bureaucratic corruption, and external wars with the neighbouring country during the fifty-four years' history. Furthermore, environmental conditions for in Pakistan are becoming promising and organizations can reap the benefits of IT as government is giving tax relief and concessions on the import of computer hardware, software and telecommunication equipment. Glass (1998b), after analysing several cases of IT-projects failure, concludes that, "at last I have found the secret that guarantees success; to err, and err, and err again, but less, and less, and less." Therefore, problems and even failure in the development of information systems should be treated not as the discouraging elements, rather it should be regarded as a 'learning experiences', because, the problem of IT failure has not prevented the field from advancing on many fronts. There is a need to follow a broad-based policy for the computerisation of public and private life because, "the life-sustaining capacity of the IT lies in its non-IT sectors such as formal and informal education (natural sciences, humanities, creative arts, technical skills, etc), better health services, developing marketing access of the rural produce while improving quality of products, participatory governance and services etc. (Abbasi and Zubair, 2001)." The IT Commission (2007) claimed that the eGovernment programs are in the process of implementation

after which mostly all the public sector government office will be online. The objectives of this programme are:

1. To provide immediate benefits to the citizens
2. To bring fundamental changes in the working of the government
3. To spur the local IT industry in Pakistan.

The most of the case studies of software failure find that poor management technique, not poor technology, is the cause of the problem (Sauer, 1993; Drummond, 1996).

## 4. THE PROPOSED SOLUTION MODEL

The differences in the environmental conditions of developed and developing countries, and from organization to organization, suggests that the frameworks formulated for the understanding of IT management issues in developed counties should not be blindly applied to developing countries. The integration of technology with local conditions requires an integrated framework in conformity with the local conditions. Achieving the objectives of computerization in Pakistan needs 'cooperation on key issues between public and private sectors, on principles to guide the development and implementation of IT policies and on basic policy approaches to major issues, this call for close coordination between government and the industry. Keeping in view the major issues and scope of IT in Pakistan, an integrated framework for the development and promotion of IT is suggested. This framework identifies the integrated role of government and private sector i.e. 'sharing of ideas, resources, and accommodation of mutual interests' to promote IT in the country. Government Functionaries: This model suggest that as government is the major player of any activity, success of the policies depends on government and its administration which is responsible for creating a healthy environment for success of computerization. Moreover, close coordination and cooperation can develop better understanding between the government and the IT community while it is a an admitted fact that the private sector is the primary engine of the information age, however the role of government machinery is extremely important as a catalyst for change, as facilitator, as regulator and as a governor of a level playing field." In this regard government functionaries must ensure:

IT Integrated Policies: Government functionaries can a play significant role in developing the IT integrated policies through the partnership of the IT community. Besides consistency of IT policy, fundamental requirement of computerization is to develop well coordinated and integrated policies to guarantee the success of computerization. In Pakistan, there is 'mismatch between policies and the ground realities'. This requires IT integrated policies i.e. integration of trade, commerce, legal and educational policies with IT policy to overcome the challenges and to meet the requirements of computerization. Through effective IT integrated policies; government can develop the physical and legal infrastructure which builds the IT users Confidence. Giving Credence to Public Interest: This study points out that IT-policy in Pakistan has not been harnessed in accordance with the public interest, rather, secondary factors are placed on the top, such as, gaining the title of computerization at national level by purchasing hardware and software without properly analyzing the orgware and peopleware, where bureaucrats tend to decide on their own without any adequate arrangement of technical consultancy. It is suggested that government must give credence to public interest in policies. IT policy may be framed keeping in view the concerns and interests of the organizations and users who use IT services. Partnership with the Private Sector: Government and private sectors are the two pillars of national development; none of them can function nor contribute alone to the national development, rather, combining the resources of the two, i.e. coordination and cooperation can make computerization happen. After then, one can expect the solution of socio-cultural and legal barriers to IT

diffusion and Internet in the country. As IT is the new and highly innovative technology and that is why any meaningful IT initiatives for computerization in Pakistan will necessarily have the coordination between the government and its agencies on one hand and partnership with private sector on the other. Participative Management: Most organizations follow the hard approaches, where the will of management prevail ignoring the physical and psychological aspects. While modern schools of thought suggest humanistic and participative approach in ISD for computerization (Checkland, 1990; Mumford, 1991'). Participation of the IS managers and end-users is useful in bridging the gap between users and developers and minimizing the end-users resistance. Therefore, several studies have suggested that, within the organization, management should abstain from the feudal mindset to the more liberal and humanistic one in order to successfully launch computerization. Continuous Updating of IT Systems: Continuous updating of IT and Information Systems can play a significant role in the success of computerization in Pakistan. Turban, McLean, et-al, 2004; Sawhney, 2002) asserts that several organizations, across the world, continuously conduct programs as an attempt to improve the IT projects by (1) monitoring and analyzing the performance and productivity and (2) to gather, share, and better use organizational resources for their success e.g. total quality management, knowledge management, productivity and creativity improvements, just-in-time processing, change management, six sigma and Balance Card.

## 5. CONCLUSIONS

Information system failure and information system success research have never been sufficiently separable, however, when one is failing, the other is forced to be creative, to dig deep and think hard, night and day. Governments and private enterprises are taking preventive measures to reduce the problems involved in the development and use of IT projects. The strongest theme, running across both the in-progress remedies and the long-term remedies, is better project management.The IS development problems differ from setting to setting; therefore, it is important to carefully analyze, during system development and use the extent, impact and nature of IS problems in concrete terms. This implies that for each stakeholder-group, the list of possible difficulties in IS should be derived. This could be used as a basis to analyze the risks associated with the IS. Here, an IS problem list can be used as a fruitful starting point. In Pakistan we need to develop a community-based platform where an appropriate order of things can help actualise the promises of ICT for reducing poverty of income and opportunity in a sustainable and equitable fashion. For example, the government needs to ensure that students and their parents are not being fleeced as they are now. This study suggests that future researchers concentrate on the humanization of IT in order to give the computer a human face, minimize the resistance and build confidence. This area of research needs further exploration where particular contributions may be made by the management and IT researchers as IT is a multidisciplinary. The empirical demands of such research, however, need to be recognized.

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