Transforming Public Sector Through e-Governance: A Case Study of Khyber Pakhtunkhwa

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Under the motto, '*Technology is Our New Ideology*,' Khyber Pakhtunkhwa's two-time elected Pakistan Tehreek-e-Insaaf (PTI) provincial government is undertaking several key governance reforms for digitising service delivery in various government departments. Taking the two key departments of education and health as case studies, this research investigates how service delivery is impacted through digitisation, what influences are generated on organisational culture, and in what manner it affects citizens' trust in the provincial government. It attempts to do so from the perspective of public service providers, i.e., the bureaucracy, and end users, i.e., the public (school and college students and hospital patients). The study employs both qualitative and quantitative methods to reach its findings. The findings of the study suggest that significant digital interventions were made by the provincial government in both the education and health sectors; the Covid 19 emergency provided a big push for the digitalisation of government services. These interventions are driven by first, the desire to generate policies based on evidence-based data and second, to optimise the efficiency, transparency, and accessibility of public services. The findings of the study suggest that the ICT-induced impacts on service delivery have from a service provider's perception induced greater efficiency, transparency, and accessibility; however, from the end user's perspective, significant constraints remain. The absence of a critical thinking approach behind technology introduction has led to the underperformance of various ICT initiatives. Additionally, there is a propensity of significant groups being left out, either due to the non-availability of resources, such as computers, and the internet, or lack of digital skills and awareness among the end users. The digitisation measures are also steered towards greater government control and less public participation in policymaking, making it as Chadwick and May (2003) suggest a model of managerial government. The findings also suggest that ICT-induced transformations in the bureaucracy's organisational culture have led to veiled resistance and scepticism of the ICT-introduced reforms from the service provider's end.

Keywords: e-government, Information and Communication Technology-ICTs, Efficiency, Transparency, Accessibility in Service Delivery

1. INTRODUCTION

Governance in modern times has undergone significant changes in terms of policies and practices, especially those designed to increase citizen participation in

broader political processes. The evolution of governance practices in the 20th century and that of the 21st are made possible primarily through growth in modern means of communications and technology. The state today is heavily reliant on information and communication technology (ICT) tools to undertake its responsibilities. This form of governance which relies on electronic communication devices, computers, and the internet to provide services to the people and engage them in the sphere of politics is termed 'e-governance'. The ICT revolution is reshaping the concept of governance in Pakistan, where government bodies, political parties, pressure groups, and other institutions are increasingly using ICTs to engage people in the sphere of politics and governance. The sub-national governments in Pakistan, including the government of Khyber Pakhtunkhwa, are undertaking many e-governance reforms in its various departments, to provide efficient, transparent, and inclusive services in the province.

Pakistan was introduced into the e-governance system comparatively late than its regional compatriots. It was in the year 2000 (August) that the government came up with its first 'National IT Policy and Action Plan' for inducting IT tools in government agencies; 2.6 million PKR were allotted in 2001 to promote 'e-governance in the country' (Ghayur, 2006, p. 1016). This was followed by the establishment of the Electronic Government Directorate (EGD) inside the Ministry of Science and Technology for initiating projects and providing guidelines and standards for software development and related infrastructure. By 2005, the 'E-Government Strategy Five Year Plan,' approved by the National E-Government Council (NEGC) provided for introducing e-applications in all government agencies, delivering efficient, cost-effective, e-services to citizens and ensuring transparency and accountability in decision-making (Ilyas, 2016, pp. 57-58). Very soon the mantra, 'e-governance for good governance' as the basis for transparent, accountable, efficient, and participatory service delivery was getting attention from the policy makers in the field (Ghayur, 2006).

The Pakistan Tehreek-e-Insaaf (PTI) government in Khyber Pakhtunkhwa under its motto 'technology is our new ideology,' claims to take a broader view of e-government to mean not just automation of government departments, but also using technology to provide the public 'a central point of access to government services', thereby placing communities and individuals in 'responsive networks of knowledge, service, trust, and accountability' (G of KP DoIT website, n.d). The completed and ongoing e-government projects are focused on creating IT infrastructure and IT training, Online Hospital Management Information System (HMIS), Virtual Teachers for Schools, the establishment of science and computer labs in schools, system analysis and re-engineering programmes for recruitment and promotion in schools (G of KP DoIT 'Completed Projects', n.d.), touch screen computers for learning of sciences subjects (Naveed, November 29, 2016), and the online college admission system for public sector colleges (Mustafa, June 23, 2017). While these digitisation engagements are supposedly enhancing people's trust in government, there is a need to understand how these are improving the efficiency, transparency, and inclusivity of services in the province, with what impacts the bureaucratic culture.

While revolutionary steps in e-governance are being undertaken by the provincial government in Khyber Pakhtunkhwa, there is a need to understand how such e-governance practices in public management are changing bureaucratic culture and ensuring efficient,

transparent and inclusive service delivery in the Khyber Pakhtunkhwa province. It is further needed to analyse how far the citizen's trust in government is impacted through digitised service delivery. There is hardly any in-depth academic research on digitalisation's impact on service delivery in Khyber Pakhtunkhwa. This necessitates a thorough investigation of how bureaucratic culture and practices are changing and which problems are limiting the effectiveness of ICT tools of governance. The main query underlying this research is: How service delivery in education and health is being transformed through ICT interventions in Khyber Pakhtunkhwa? Therefore, this research investigates the use of ICT tools by the Khyber Pakhtunkhwa Government in education and health for understanding how far digitisation has impacted the bureaucratic culture by generating efficient, transparent, and accessible services. Unless bureaucratic adjustments to technology influences are not researched, it will be difficult to realise the goals of efficient service delivery and grievance redressal, which are the essence of a rational bureaucratic system.

2. LITERATURE REVIEW

The use of technology is today seen as an offshoot of direct democracy in politics. The internet provides a timeless and space-less paradigm of politics (Castells, 2000). Many developing countries have embarked upon the journey of e-governance believing that ICT has the power of reshaping governance. As such, technology has been credited with the renewal of democracy and is termed an 'instrument of democratic liberation' (Chadwick and May, 2003, p. 272). The use of the internet as an active agent for participation in the political process has been defended on several counts. The internet provides a medium for participation in the political process, whilst maintaining the secrecy of their private identities; the subjects could otherwise be discriminated against by the state as being incapable of participating in mainstream politics (Smith, 2015). 'Internet subjects' can even challenge traditional representative democracies, which are subject to the limitations of size, place, and scale. The internet can give more freedom in terms of participation in political debates and decision-making. Andrew Chadwick in his book *Internet Politics* terms the introduction of ICT in governance as the 'renewal of democracy' and calls it an 'instrument of democratic liberation' (Chadwick, 2006).

A further aspect of ICT in politics is that it has lowered the cost of communication between the government and citizens and revitalised the representative system by opening up channels to those who traditionally were not allowed to participate or had constraints of leaving their homes. Among many other advantages of e-government are enhanced efficiency and competence, saving of time, improved communication and coordination between governments, businesses, and citizens, public facilitation through online access to services, greater transparency, and more accountability (Joseph, September 2015). However, the meaningful use of the internet and the ICT for democratic governance depends on the ability of the governments to devise and implement appropriate policies for citizens' participation. Some believe that digital government can 'enhance or erode democratic processes', arguing that this will depend not only on the use of the latest technology but also on 'policy choices, management strategies, and cultural responses' (Dutton, 1999). The ends for which IT is used and citizens' access to it will determine the influence of technologies in democracy and politics in the real sense (Wilhelm, 2000, p. 149).

Some of the published literature suggests that ICTs can be effectively utilised to enhance the dissemination of information, ameliorate public service delivery, ensure governmental accountability, and bring inclusiveness in terms of citizens' participation in governance, thereby enhancing the citizens' trust and confidence in the government (OECD, 2003; Tsankova, 2010; Bhatnagar, 2014; UNDESA, 2018; Anderson, 2009; and Carlo Bertot, et al. 2010). It is assumed that the use of ICT tools in the public sector will enhance efficiency, policy effectiveness, and democratic values (OECD, 2003). Here, e-governance is believed to be a 'good management' strategy and a step towards the 'New Public Management' (NPM) process in this information and knowledge society (Tsankova, 2010). Bhatnagar (2014) argues that since governments are the largest providers of information and services to the people, therefore, their outdated methods of service delivery results in corruption and inefficiency. He suggests that well-designed e-governance projects with process reforms that target enhanced transparency and accountability reduce the discretion vested with civil servants and in turn help enhance efficiency and lower corruption (Bhatnagar, 2014, p. 23). As contended by Rana et al., public organisations in democracies are programmed to deliver services to the citizens and the more the level of accountability, the more efficient public service delivery will be (Rana, et al. 2019). ICTs are argued to ensure transparency, particularly, by granting citizens access to crucial policy-related information and allowing them to keep a check on the government. The ICTs encourage citizens' participation in governance through an exchange of knowledge, ideas, and experiences between them and the government; in this capacity, e-governance is an enabler for the citizens of a state (UNDESA, 2018, p. 5).

It was more than a decade ago that Thomas Barnebeck Anderson (2009) talked about the introduction of the ICT system in the tax departments of the non-OECD countries aimed at reducing contact between the tax collectors and taxpayers and doing away with the opportunities for pay-offs; findings suggested that the use of ICTs (between 1996 to 2006) did reduce corruption in these countries. Similarly, India's online property record system, the Philippines and Chile's e-procurement systems, the US government websites containing information access to data on government expenditure, and the file tracking systems are all examples of e-government usage for reduced corruption and increased transparency (Bhatnagar, 2003; Anderson, 2009). Subhash Bhatnagar (2003) argues that ICT initiatives may reduce corruption and ensure transparency by providing information on government rules, citizens' rights, government decisions and actions, and by the monitoring of government actions, spending, and evaluation of government performance. However, as argued by scholars, cultural influences can prove a daunting challenge to government openness and the anti-corruption therein (Carlo Bertot, et al. 2010). The ICT intervention in transparency is more evident in countries with a tradition of openness. Therefore, it is argued that *'ICTs can be used to promote transparency in cultures that have a tradition of government openness'* (Carlo Bertot, et al. 2010, p. 268). Other compatible evidence is more challenging. In a survey conducted on 1,200 government officials across 70 countries on the issue of how digital technology was transforming the public sector operations and service delivery, an overwhelming majority argued about digital interventions having a major impact on the governments, but a clear majority or around three-fourths of the respondents argued that such digital technologies were disrupting the public sector. It is

interesting to note that most of these governments where surveys were conducted were in the early stages of this journey. Not to mention the fact that around 70 percent of government officials accepted that they lagged behind the private sector in e-service delivery. The study also indicated two drivers for this transformation: cost and budgetary pressures; and citizens' demands (Eggers and Bellman, 2015).

As identified in the literature, the e-government service delivery initiatives in the developing countries have run into many problems, including the lack of political support, issues of digital divide, deficient human resource, and inadequate infrastructure in Kazakhstan (Bhuiyan, 2010); low levels of awareness, poor quality of information, concerns about security of personal information affecting public intention to use e-government services, fewer technological infrastructures, poor IT literacy, organisational characteristics and collaboration with other organisations in Pakistan (Rehman, Esichaikul & Kamal, 2012; Qaisar & Khan, 2010); high illiteracy rate, a lack of ICT infrastructure, low levels of awareness, funding, and commitment on the part of government officials and leadership in Nepal (Sharma, Bao, & Peng, 2014); the lack of coordination, sparse information sharing, low ICT literacy and e-government awareness in Afghanistan (Samsor, 2021); and deficiency of IT infrastructure, low levels of IT knowledge, and little trust in public data protection and information security in Kuwait (Al-Mutairi, Naser & Fayez, 2018). There is an acknowledgement in the literature that developing countries have suffered from high levels of failure with e-government experiments, especially in the formative stages, which mainly resulted from 'reality gaps' between the 'e-readiness' of government organisations and 'large design' ideas of the governments (Heeks, 2001). Hence, there is an emphasis on building institutional and technological infrastructure, awareness levels, and commitment on the part of leaders, as well as the development of adequate human resources and provision of effective legislative support (Heeks, 2001) to make e-government initiatives work without many setbacks and constrictions.

3. METHODOLOGY

Since the research objectives are exploratory and analytical, therefore, a mixed method (MM) of data collection from qualitative as well as quantitative sources was utilised. The research is evidence-based and exploratory because it explores the use of various ICT tools by the Khyber Pakhtunkhwa government for service delivery. It is analytical because such ICT interventions were analysed to understand in what manner service delivery is becoming more efficient, transparent, and inclusive and what if any organisational and cultural changes are taking place in the provincial bureaucracy. The basic premise behind using MM research design is that combining more than one type of data source under multiple research phases (Creswell and Plano Clark, 2011, pp. 7–11) provides a fuller understanding of the research problem than a single or mono-method approach (Guest, Greg & Fleming, Paul, 2015, pp. 581–610).

Qualitative research methods drew on secondary as well as primary sources. In secondary data, books, journals, reports and newspaper articles, and official documents were accessed, including the Khyber Pakhtunkhwa ICT policies and other related policy outlines. The primary data was collected through qualitative semi-structured in-depth interviews from official respondents (BPS 17 and above executive officers who were

involved in policy making and execution) selected through purposive sampling from two sets of government departments. Firstly, from the provincial government, IT-focused departments,[1] including Science and Technology & Information Technology department (ST&IT), Performance Management and Reforms Unit (PMRU), and Khyber Pakhtunkhwa Information Technology Board (KPITB). Secondly, from the provincial government's education and health departments. In education, the Khyber Pakhtunkhwa Elementary and Secondary Education Department (KPESED), Education Monitoring Authority (KPEMA), and Khyber Pakhtunkhwa Higher Education Department (KPHED) and in health, Directorate General Health Services, Health Department, Lady Reading Hospital (MTI), Peshawar and Ayub Teaching Hospital, Abbottabad were targeted for interviews. The reason for choosing the education and health departments was that many of the key ICT interventions here are highly publicised by the provincial government. These departments are primary service providers to the people and people's perception and trust in government are most significantly impacted by how these departments perform their functions. Since the goal of qualitative research is the attainment of saturation, therefore around 25 interviews/ FGDs were conducted from the above-mentioned departments. All interviews were audio-recorded with the permission of the respondents except for 3, who did not permit us to audio-record the interviews with them. In these cases, the information was recorded through descriptive field notes. Analysis and synthesis of the interviews helped find further themes/patterns that emerged in participants' experiences and connections between the experiences.

Table 1

Details of Research Data Collection

Data Collection	Education Departments KPESED & KPHED	Health Department	IT-focused Departments: ST&IT; PMRU; KPITB	Total
Interview	4	7	3	14
FGDs	6	1	4	11
Survey Sites	8	2	–	10
Survey Respondents	201 (Approx. 100 each from schools and colleges	104	–	305

For the quantitative part of the research, a survey questionnaire was used to collect data from a sample size of 305 respondents. The rationale for choosing a 300-sized sample was to represent in equal numbers the end users from secondary-level education (schools), higher-level education (colleges), and major tertiary hospitals. The aim was not only to understand the penetration of ICT tools among end users, i.e., students and patients, but to know how far service generation through ICTs had increased citizens' trust in the provincial government. The standard method for learning public perception and thinking is survey research (Morgan, 1997). The survey questionnaire had three

[1]The IT departments generate, facilitate, promote, and regulate e-government activities in the different government departments at the provincial level.

parts. Part one related to demographics; part two included questions about access to digital tools, awareness about e-government initiatives, and the use of these initiatives; and part three had a Likert scale section to understand the impacts of ICT tools and citizens' trust in the government. This survey was uploaded on Kobo Toolbox, data generated were processed through the SPSS software, and generalisations were derived.

Since the research focused on performance and service delivery through ICTs in 2 critical government departments, therefore the site selections were made keeping in view these service-providing departments. Two major districts of Khyber Pakhtunkhwa, including Peshawar and Abbottabad districts were chosen for data collection. In education, a total of 8 institutions representing secondary and higher secondary (4) and college education (4) were selected from Peshawar and Abbottabad which had the highest enrolments of students. Out of each set of 4 institutions, 2 were boys, and 2 represented girls' institutes. Around 25 respondents were chosen from each of the 8 survey sites, bringing the number of total respondents to around 200; around 100 from schools and around the same number from colleges. Systematic random sampling techniques were adopted to select respondents in schools and colleges. The colleges include Government Postgraduate College No.1 (GPGC), Abbottabad; Government Girls Degree College for Women (GCDC), Abbottabad; Government College for Boys (GC), Peshawar; and Government Frontier College for Girls (GFC), Peshawar. The schools include Government Higher Secondary School No. 1 Abbottabad; Government Comprehensive Girls High School (GCGHSS), Abbottabad; Government Shaheed Osama Zafar Centennial Model Higher Secondary School No. 2 Peshawar (GHSS No. 2); and Government Girls Lady Griffith Higher Secondary School (GGHSS), Peshawar.

In health, one tertiary hospital in Peshawar-Lady Reading Hospital Medical Teaching Institute (LRH-MTI) and one in Abbottabad-Ayub Teaching Hospital (ATH-MTI) were chosen because these provide health care services to thousands of patients daily. A total of 100 surveys were conducted: 50 from each hospital site. The survey respondents were primarily either patients or their relatives who accompanied them to hospitals for seeking medical treatment. In the case of hospitals, the convenience sampling method was used following the Mall Intercept Survey Technique to collect data through face-to-face interaction. The enumerators filled in the questionnaires in Kobo Toolbox software uploaded on tablets.

4. THEORETICAL FRAMEWORK

The literature on digital governance outlines two broad approaches for identifying the relationship between technology and society; Technological Determinism and Social Constructivism/ Social determinism (Winner, 1980; Chadwick, 2006; Johnson & Wetmore, 2009). The technological determinists argue that technology is an autonomous and powerful force, which determines society by producing direct and inalterable social changes. In this argument, technology follows a linear path of progression, uninfluenced and unrestrained by social and political forces, and compels people and institutions to behave in certain ways (Johnson & Wetmore, 2009). In the opinion of Langdon Winner, artefacts have political qualities perceived in their specific design, history, use, and arrangement, which in turn establishes patterns of power and authority in society (Winner, 1980). "*The things that we call technologies are ways of building order in our*

world. Many technical devices and systems contain the possibilities for … ordering human activity… technologies influence how people are going to work, communicate, travel, consume, and so forth…" (Winner, 1980, p. 127). The social constructivists, on the other hand, contend that technology does not follow a natural or logical order of progression, rather it is controlled by man. They maintain that society through interest groups, laws, economy, and political decisions shapes and controls the design, production, and dissemination of technology; even the users of technology interpret and reinterpret technologies by using them for purposes for which they were not designed (Johnson & Wetmore, 2009). To them, there are different ways in which technology and society are interwoven, for example, technology can be used by employers to subvert the autonomy of employees; it can reinforce or break down racial classification; and can be associated with lofty goals like equity, security, and progress (Johnson & Wetmore, 2009).

In another line of argument, Andrew Chadwick contends that sticking to any of the two assumptions or approaches is problematic. He asserts that it is too convenient to assume that the effects of technology on society can be understood just by examining its innate properties. Similarly, it is equally problematic to assume that features of technology have no bearing on how it may be used politically. A more balanced position would be to recognise that technologies have political properties, simultaneously placing their use in the political context (Chadwick, 2006). He examines the influence of communication technologies on power, citizen participation, political parties, pressure groups, democracy, public bureaucracies, social movements, and internet-enabled citizen activism, as well as discusses the issues of governance, political apathy, surveillance, privacy, and security. He contends that internet technologies are being used by civil society and governments simultaneously to posit their point of view; the flow of information is quick and cheap but is restricted by government surveillance and public apathy (Chadwick, 2006). Like Winner, who believes that some artefacts are inherently political shaping the patterns of power and authority in society, Chadwick understands new communication technologies as 'political artefacts,' which exist in a political context. He assumes that the 'politicisation of the Net' arises from the nature of the technology itself and that it, in part, structures a society's social and political action (Winner, 1980, p. 122; Chadwick, 2006, p. 20).

In the realm of e-governance, Andrew Chadwick and Cristopher May (2003) identify three models of e-interaction between states and citizens. The three heuristic models of interaction include the *Managerial model*, the *Consultative model* and the *Participative model*. The *Managerial model* is characterised by the provision of information to the public more efficiently through the use of ICTs. The *Consultative model* focuses on communication between citizens and the government; particularly, communicating the opinion of citizens to the government directly without involving intermediaries. In the *Participative model*, the citizens are truly active and participate in government affairs. However, this interaction and participation take place through multiple associations, actors, and platforms. Therefore, this is a multi-directional interactive model (Chadwick & May, 2003). By using Chadwick and May's *'Managerial, Consultative or Participative Model of Interaction*,' we can develop an understanding of how far participative the practice of e-governance in Khyber

Pakhtunkhwa is and to what extent it follows the general path of information dissemination alone and discourages an active engagement of citizens in consultation and participation. For example, the facility of citizens' online complaints can hardly be termed 'consultative', as the public may communicate grievances to the department concerned and give feedback on government response to grievance redressal, however, the aspect of citizen's consultation in making and running the different applications remain absent. Therefore, we come to Chadwick and May's argument that democratic interaction is being sidelined by managerialism.

5. TRANSFORMING PUBLIC SERVICE DELIVERY IN EDUCATION AND HEALTH

'Is Technology the Silver Bullet?'

All the official respondents from the two Education Departments of KPESED and KPHED and the Health Department and Directorate General of Health Services underscored the importance of ICTs in the light of the necessities of current times and expressed their confidence in the current provincial government possessing enough enthusiasm and innovation to bring ICT induced changes in service delivery. The major ICT interventions identified in education and health included for education, online admissions, computer labs and smart boards for classroom management, biometric attendances for teachers and students, digitisation of schools and colleges data, dashboard creation to monitor the institutions, NTS computer-based testing for recruitment, e-learning portals, and the system of e-transfers. In health, initiatives include disease surveillance and data generation from the field, online access to pathology reports, biometric attendance for para-medical staff, electronic record systems, or the hospital management information system (HMIS), E-Vaccs, telemedicine departments in hospitals and data generation from hospitals and BHUs through the Independent Monitoring Units.

### 5.1. ICTs & Efficiency in Service Delivery

'Efficiency is the Hallmark of Bureaucracy' (Max Weber)

The education and health department officials spoke enthusiastically about ICTs improving the efficiency of service generation. In education, it was argued that ICTs improved the standard of education in government schools, with some designating the digitisation programme as primarily an 'efficiency programme'. They argued ICTs to be 'good management tools' which allowed them to continue official correspondence and coordination in off timings too. Since human interventions in official working had been reduced and human discretion could, therefore, be avoided in official businesses (KPE&SED and KPHED officials). This ensured quick disposal of work. The officials saw digitisation as improving the efficiency of their department's functioning in terms of time-saving and speedy disposal of work. One example here was the HEMIS in the HED, which was established in 2005 had automated all official correspondence for rapid information flow and timely decision making; it also stored all information regarding colleges, including the staff, and is

tasked with the completion of a file tracking system (KPHED officials). However, there was also the backup of all the information on paper. In the context of a well-developed Learning and Management System (LMS), for increasing student-teacher e-learning and interaction capacities and online classes, especially in the pandemic times through Zoom and Google Meet, it came to light that the system was not well developed enough to enable college teachers to upload presentations, etc., for students access; or manage attendance of students online, reflected on a dashboard; however, tenders for a well-developed LMS system were reportedly underway. Other ICT initiatives praised by the officials for improving public sector education provision included the smart board technology in schools, the computer labs and IT experts in schools and colleges, the appointment of schoolteachers through computer-based NTS tests, teachers' online training, digital learning portals for schools, biometric attendance for teachers and online admissions for colleges (Education Department Officials).

If we look at the efficiency-related claims of the education department officials and try to compare them with the responses from the end users, we realise that survey results indicate some digital interventions to be incredibly popular, probably because they are now mandatory, for example, the online admission system for colleges. Around 55 percent students showed their satisfaction and 60 percent thought it to be easier than physical admission (Figure1).

Fig. 1. Student's Satisfaction Level with Online Admission System
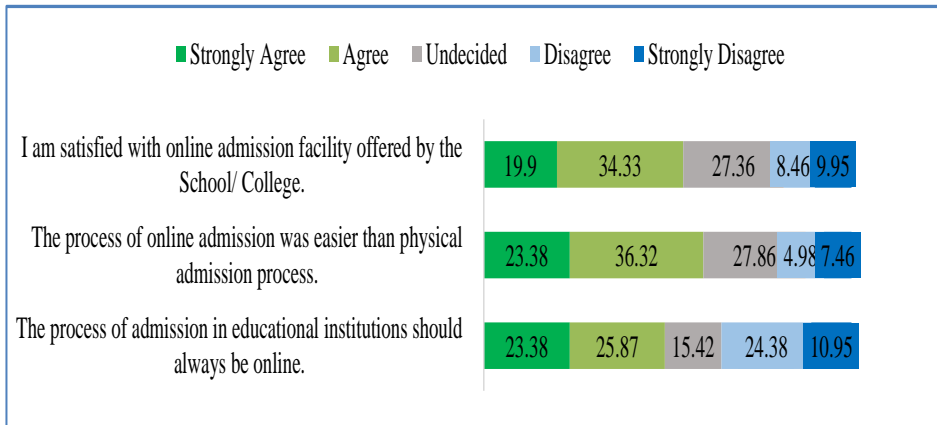
Similarly, other steps such as computer education in schools and colleges elicited a higher response of around 58 percent as receiving some computer exposure in schools and colleges. The computer skills learned in these classes included MS Word (44 percent), MS Excel (22 percent), and computer programming (16 percent) (Figure 2). However, an alarming number of students (41.29 percent) stated that they learned no skills, which suggests a less meaningful exposure to computer literacy in schools and colleges. Additionally, only around 50 percent expressed satisfaction with the infrastructure in computer labs (Figure 3).

Fig. 2. Student's Response to Skills Gained from Computer Classes

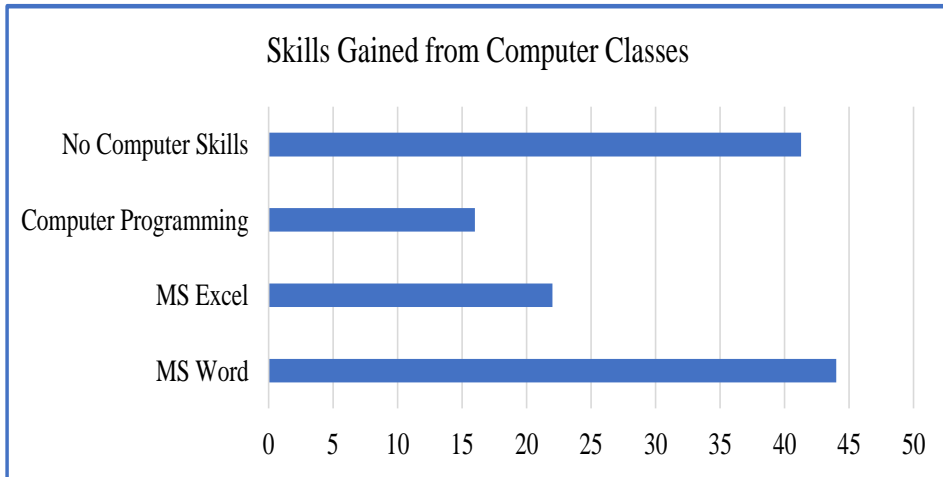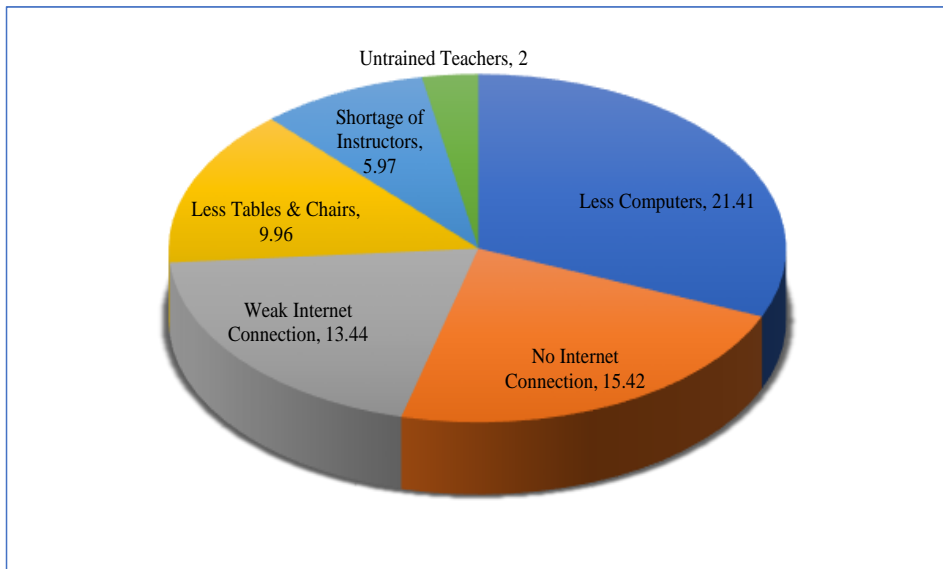Skills Gained from Computer Classes

Fig. 3. Deficiencies in the IT Lab Pointed Out by Students

For most other digital interventions, unfortunately, the survey response from the end users was not very encouraging, for example, in the case of smart boards, a staggering 80 percent of students said they were not taught regularly on them (Figure 4) and a majority of 55 percent also showed a likeness for conventional white boards for learning purposes (Figure 5). This is despite the great emphasis from officials, it was also reported from other sources that around 70 percent of smart boards installed in schools were not being used by the teachers; the reason being a limited two-day training could not give them enough expertise or enthusiasm to handle such boards for undertaking successful teaching (Ashfaq, 2016).
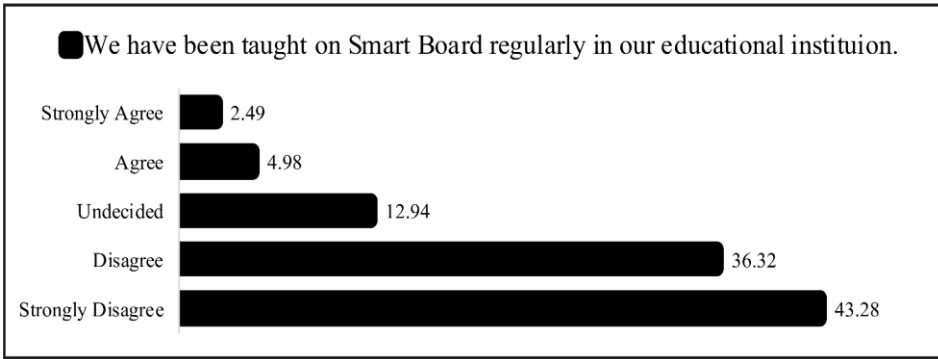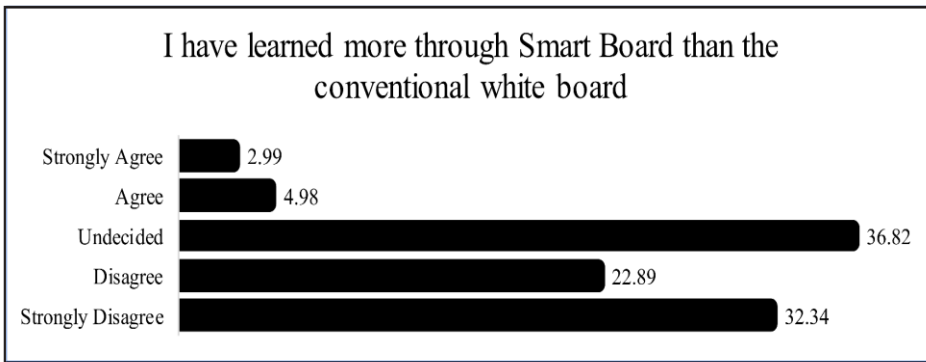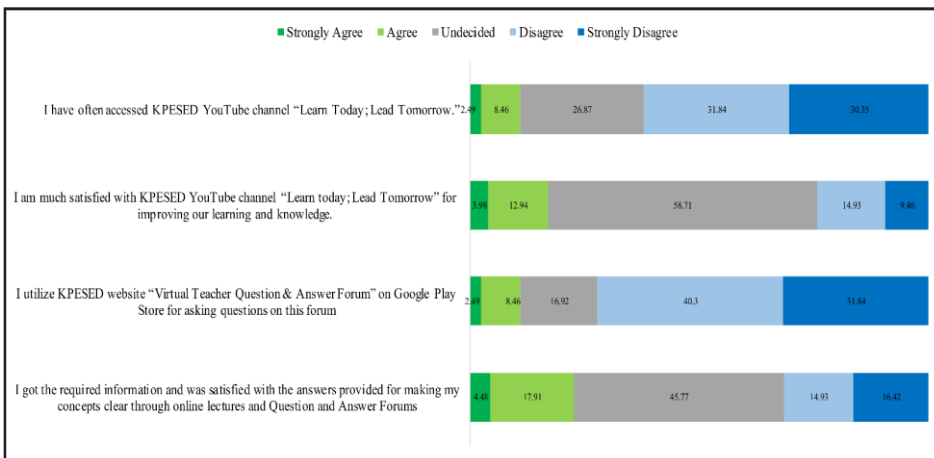
Fig. 4. Smart Boards and Student Learning

We have been taught on Smart Board regularly in our educational instituion.

Strongly Agree	2.49
Agree	4.98
Undecided	12.94
Disagree	36.32
Strongly Disagree	43.28

Fig. 5. Student's Survey Response to Smart Board and Learning

I have learned more through Smart Board than the conventional white board

|	
Strongly Agree	2.99
Agree	4.98
Undecided	36.82
Disagree	22.89
Strongly Disagree	32.34

Another dismal performance area is that of digital learning platforms. The results of the surveys show that there was a lack of awareness about online digital e-education programmes among most students (see Figure 6).

Fig. 6. Students' Response to Digital Learning Programmes

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
I have often accessed KPESED YouTube channel "Learn Today; Lead Tomorrow."	2.49	8.46	26.87	31.84	30.35
I am much satisfied with KPESED YouTube channel "Learn today; Lead Tomorrow" for improving our learning and knowledge.	3.98	12.94	58.71	14.93	9.46
I utilize KPESED website "Virtual Teacher Question & Answer Forum" on Google Play Store for asking questions on this forum	2.49	8.46	16.92	40.3	31.84
I got the required information and was satisfied with the answers provided for making my concepts clear through online lectures and Question and Answer Forums	4.48	17.91	45.77	14.93	16.42

It is the entwined forces of teachers, students, and the school environment that can help produce digitally supportive schools and colleges. However, if the teachers are hesitant to use technology in the classroom (such as smart boards), then the students will also lack the confidence to use technology. A large percentage of students (62 percent) remained undecided over their teacher's reluctance to use technology (Figure 7). This is probably because around the same number earlier did not have exposure to smart board teaching technology.

Fig. 7. Student's Response on Whether the Teachers were Digitally Supportive or Not
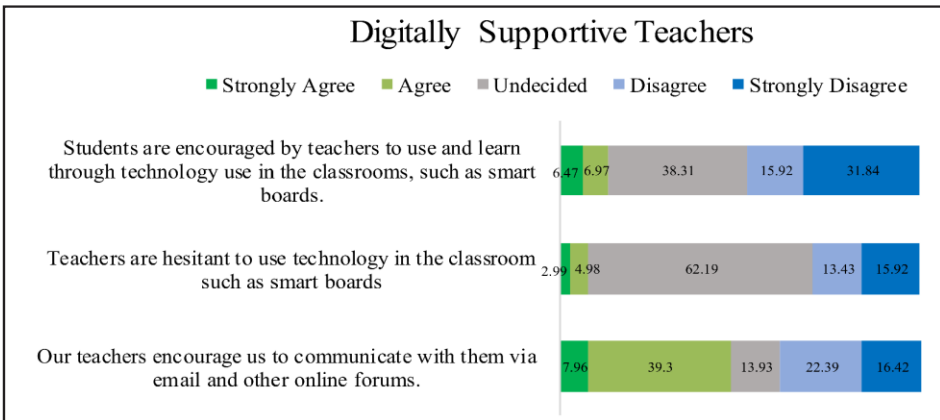

In the realm of health services generation too, digitisation was argued to have brought greater efficiency in the working of the hospitals and the health department's response to disease emergencies. The bureaucracy reported the use of real-time data on Covid through the ICTs speeded up the process of decision-making in the health department. Efficiency is also seen in the timely and effective response to disease outbreaks by the government. Here the officials made comparisons with the earlier manual data entry practice and the resultant belated government response. The ICTs helped identify health emergencies due to real-time data reporting; made mandatory for doctors to report within 24 hours of the spread of different infectious diseases. Digitisation saved the costs incurred on X-RayY printing and multiple visits in case of non-accurate scanning, saving patients from harmful radiation exposure. Similarly, the radiology report as soon as it goes through a C.T. scan can be viewed by the consultants; thus, time wastage is avoided. Only X-Rays were not directly uploaded, only when required, which again saves time and film costs; this also ensured the element of accuracy and digital X-Rays could also be zoomed in on the screen to help reach a correct diagnosis.

The IT officials in hospitals reported productivity of teamwork improved especially in public sector hospitals as a result of IT interventions. The DHIS official also informed us about making key performance indicators to measure the efficiency of different hospitals in the province; these performance indicators displayed on the dashboard could be monitored to understand how hospitals were performing. However, reservations were expressed about the electronic monitoring system of diseases (primarily

run by the Health Department) for not being very successful due to the wastage of resources on separate reporting and indicators of different diseases, which necessitated the appointment of multiple programme coordinators (Health Department Officials). There was also stress that such efficiency is generated when there is effective monitoring and reporting on ICT tools usage and the tendency to reprimand and punish those who are not effectively utilising the same (Health Department Officials)

The IT tools reportedly were making health service generation in hospitals faster. However, despite the promise of efficiency, the survey results from end users show that, on average, 48 percent of the patients had to wait for an hour or more to be examined by the doctor after taking the slip (*parchi*) for OPD services (see Figure 8).

Fig. 8. Survey Response Showing Patient's Waiting for Doctor's Examination
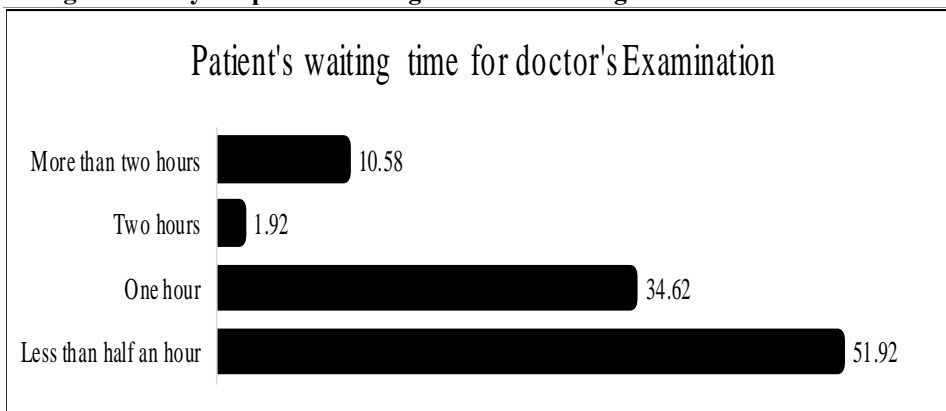
When patients were asked if they faced a delay in accessing healthcare services in the Khyber Pakhtunkhwa public hospitals, around 43 percent reported that they faced a delay of some sort in accessing healthcare services at different levels of government healthcare facilities (Figure 9).

Fig. 9. Patients' Response to Delays Faced in Accessing Healthcare Services in Public Hospitals in Khyber Pakhtunkhwa
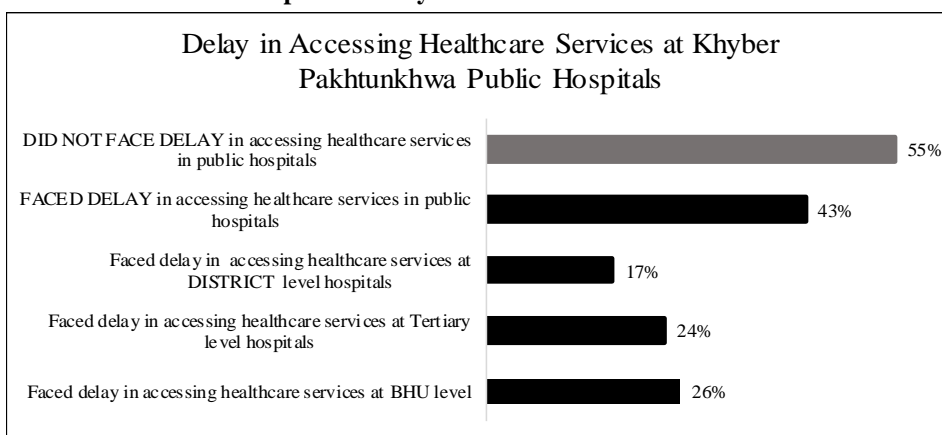
5.2. ICTs and Transparency in Service Generation

Access to information and transparency is one of the themes of digital government and researchers agree that in the information society of today, governance involves critical aspects of how information is collected, analysed, used, and disseminated (Dawes, 2009; Scholl, 2006 & 2014). Internet portals of the government institutions help reduce perceptions of corruption against the government and its institutions (Garcia-Murillo, 2013) and government institutions' strong web presence also ensures transparency and citizen participation (Jones, 2011). In the realm of transparency and accessibility to data in education as well as health, most of the data and information available on the KPHED as well as the KPESED website is outdated, dating back several years, which shows a clear failure to provide up-to-date information to the citizens frequently. This is also true for the health department as well as the teaching hospitals and other levels of hospitals and BHUs lacking well-developed and interactive websites with related information.

In the realm of transparency in education, one of the most recently introduced (September 2021) digital interventions is that of 'e-transfers;' with claims to 'revolutionise teacher transfers,' pave the way for quality learning, and ensure zero political interference in postings and transfers of school and college teachers. It is also publicised as a grievance redressal mechanism for teachers to submit their grievances online (KPESE Department GoKP, n.d.). The officials from education talked in length about the biometric attendance system for teachers introduced in around 288 colleges (out of 313) and around 60-70 percent of the schools. All education offices including DEO offices in districts also reportedly had bio-metric attendance systems. Official interviews confirmed that biometric attendance in schools brought down teacher absenteeism; teacher attendance improved by 95 percent. DEO's regular school visits are uploaded and ranked on District Performance Evaluation Scorecard monitored by the respective secretary and chief secretary. Resultantly, teachers' punctuality improved as a result of reporting real-time data to the DEOs office. Similarly, the employment of school teachers through computer-based National Testing Service (NTS) tests for recruitment in government schools, not only supports the use of technology for employment but also makes the process transparent. The NTS system was claimed by officials to be 100 percent transparent, also bringing political interference down to zero (Education Department Officials).

However, a monthly government report from January 2020, declared the performance of teachers, students, and relevant staff in Khyber Pakhtunkhwa's 347 higher secondary schools as well as in district education offices as unsatisfactory and used the term '*very discouraging*' for teachers in some schools of district Peshawar, as well as other districts. It was reported that the teachers remained absent from duty after registering their bio-metric attendance (Yousafzai, 2020). The survey results show that the majority of the students (60 percent) believe the biometric attendance of the teachers helped solve the issue of teacher absenteeism. However, a small number of students (26 percent) were not sure. Add to it those who disagree, and we have around 40 percent of students who think otherwise (Figure 10).

Fig. 10. Biometric Attendance of Teachers and Improvement in Teacher Absenteeism
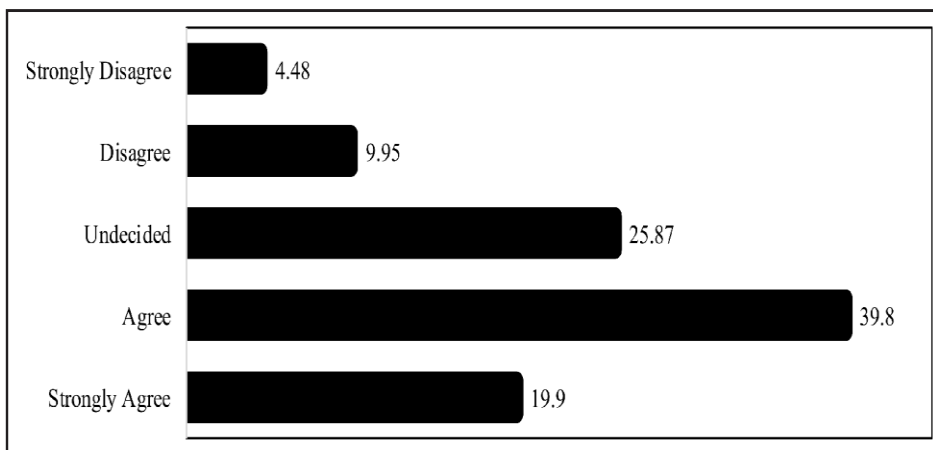

The results generated from the survey further show that a clear majority of 71.15 percent of students responded as being unaware of any online feedback system for evaluating teacher's performance, nor had they ever given their feedback on teacher's appraisal. Similarly, students also expressed that they were not allowed to give their feedback on the school/college administration performance either (83.58 percent).

In the domain of digital health and transparency, the officials reported that ICTs were not only improving the quality of health care but also speeding up the process of catching leakages within the health system. The biometric attendance of doctors and paramedics was ensuring their timely presence in hospitals. There was the added aspect of service generation becoming more transparent and accountable in hospitals. The IT director of LRH reported that the patient's test result as well as treatment was now time-bound electronically. The X-ray results getting mixed up (this happened in the manual system) was also put to rest with the digital X-ray machine. The system of bar-code which is machine-readable, avoided such errors, resolving issues of 'health data manipulation.' The diagnosis also being more accurate as digital X-rays could now be evaluated by the doctor from close angles through the facility of zooming in. The digitisation of patient record underway in the medical record numbers (MRN) system, will help the government to hold the local BHU responsible for not treating the local patients for simple ailments and forwarding them to big hospitals in cities.

The public tertiary hospitals also ran an online complaint system for patients to record their grievances. However, quantitative survey results indicate that none of the patients accessed the online complaint registration system of the hospitals. The survey respondents when asked if they ever had registered a complaint about the hospital services, 87 percent of the respondents stated that they never had lodged a complaint about the hospital services. The 5.77 percent who had registered their complaints had done so by writing to the hospital administration (see Figure 11).

Fig. 11. Complaint Registration about Health Services
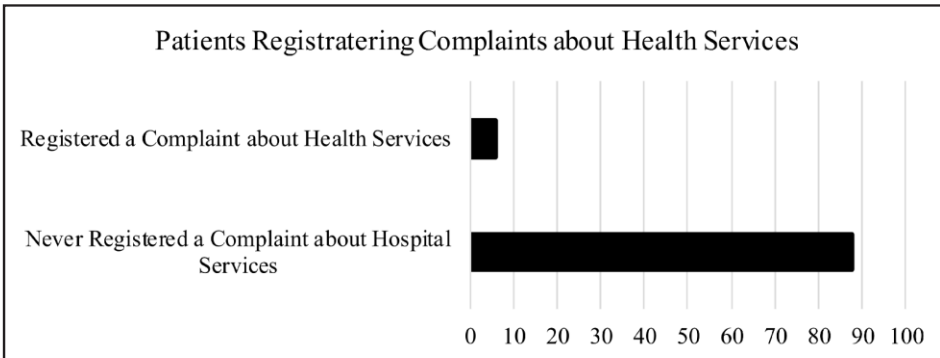
Even though both the LRH and the ATH hospitals had adequate website presence, which provided ample information about the hospital services, the doctors available in each ward, the number of departments, staff, beds, the OPD timings, *Sehat* Card Plus services, online doctor's appointment (only in LRH MTI, Peshawar), information about different lab tests and reports available, etc., still, 48 percent of the respondents had never visited the hospital website for any sort of information. Around 26.92 percent remained undecided implying they did not know about the existence of any hospital website (see Figure 12).

Fig. 12. Survey Results Showing the Percentage of Patients Visiting the Hospital Website
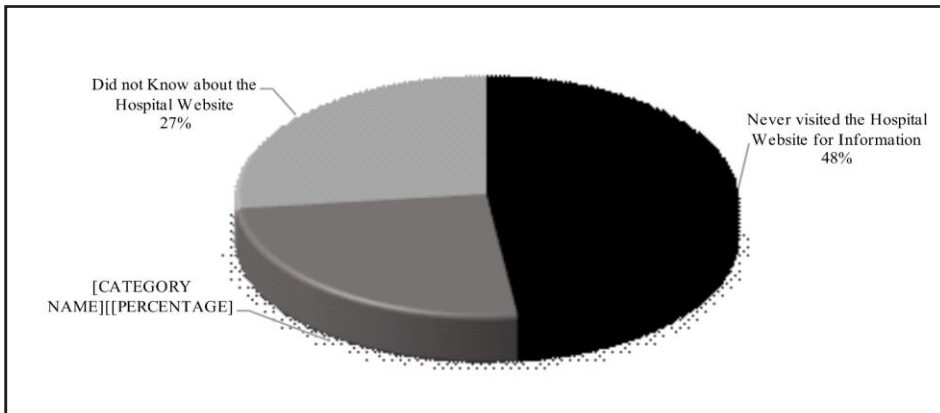

5.3. ICTs and Accessibility in Service Generation

Inclusivity through e-education was linked with infrastructure facilities available in schools and colleges and the financial resources available to the parents. The education department officials argued that e-education programmes can improve the quality of education for all only when it is accessible to children. An important aspect of inclusivity was that mostly underprivileged children were studying in public sector schools, which meant that they lacked the resources to afford digital gadgets for utilising online sources of knowledge. Inclusivity is also hindered by around 30 to 40 percent of the secondary

and higher secondary schools lacking any computer labs and smart boards. The situation for the middle schools is not very encouraging. A 2019 Express Tribune report cites 8,000 middle schools in Khyber Pakhtunkhwa not possessing any IT lab, or IT teachers, despite computers being one of the 9 core subjects there. This meant around 100,000 students in such schools faced such shortages (Haroon, 2019).

The survey results on accessibility to computer classes show that a majority (58 percent) conceded to receiving some sort of computer classes at their schools and colleges. Among the group who received computer education, a majority (51.24 percent) agreed that the computer classes they received in their schools/colleges were beneficial to them in learning basic computer skills. However, around 34 percent of the students were undecided on the benefits of computer classes and a small number (14.92 percent) thought computer classes to be ineffectual (see Figure 13). An alarming revelation was that a considerable percentage of students (42 percent) had never received any kind of computer education at all.

Fig. 13. Computer Classes and Student's Accessibility Issues
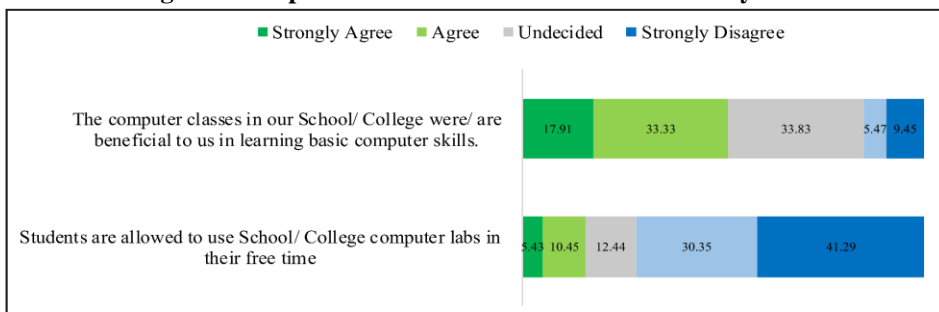
When students were asked in the survey if they were allowed to use school/college computer labs in their free time, a majority (71.64 percent) responded in negative and 12.44 percent were unclear whether their school/college would allow them to use the computer labs when they needed to use it. This shows that our schools/ colleges are quite far away from being 'digitally supportive,' a concept introduced by Wastiau, et al. (2013) who argued that state-of-the-art ICT structures along with the opportunity to access it were imperative to help improve digital competencies among students and ensure 'digitally confident students.'

Inside the schools too, certain policies hamper the accessibility of students to computer education. For example, as suggested by interview respondents, students were exposed to computer literacy from grade 6 (middle schooling) and onwards. On further query, it was revealed that computer science was not compulsory but an optional one left to the choice of students to choose from among Arabic, Pashto, and other languages. The officials informed that hardly 15 to 20 percent of children in public sector schools could benefit from digital education initiatives as a majority of the students came from poor families. A look at the graph (Figure 14), shows the income disparities of children studying in public sector schools and colleges, which in turn leads to disparities in accessing digital devices and tools (Figure 15). The officials rightly argued that unless the end users, i.e., the students in public sector colleges and universities are not facilitated

with the provision of cheap internet packages, mobiles, and laptop devices, the students will fall behind in education as compared to the private schools and college students. In a survey done by the HEMIS in colleges to gauge the level of preparedness of students in Khyber Pakhtunkhwa for online classes (availability of 3G 4G services, laptops, etc.), it was revealed that only 5 percent could confirm the availability of these facilities.

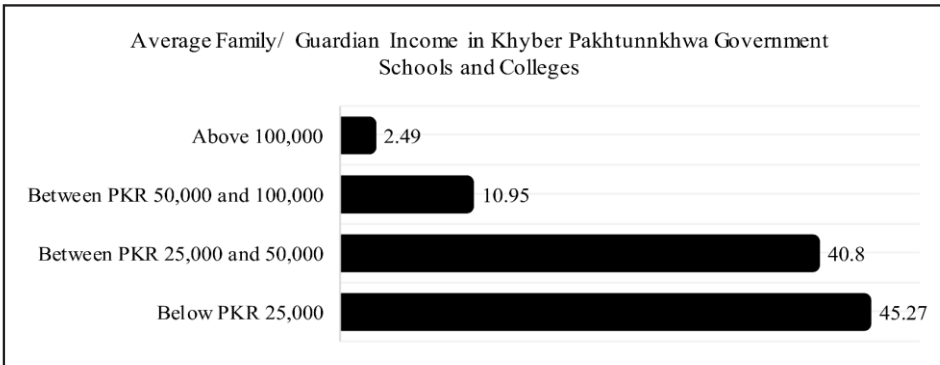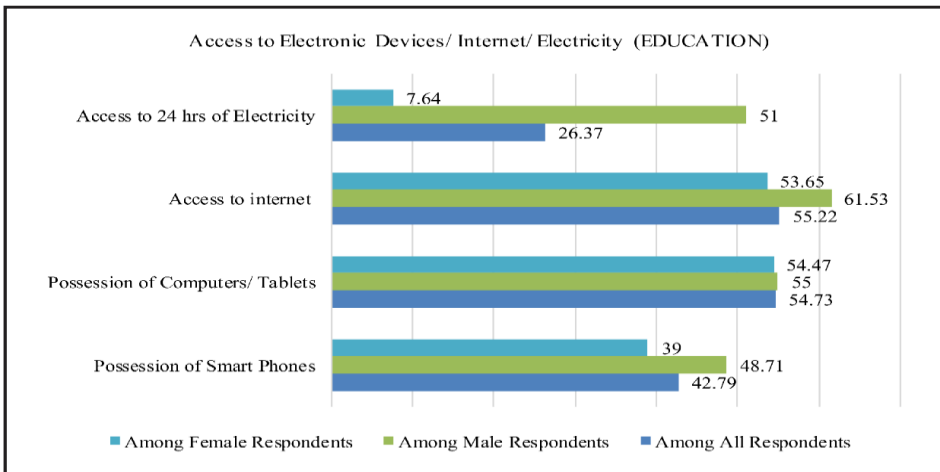**Fig. 14. Average Family/ Guardian Income of Students Studying in Khyber Pakhtunkhwa Government Schools and Colleges**

Average Family/ Guardian Income in Khyber Pakhtunnkhwa Government Schools and Colleges

Category	Value
Above 100,000	2.49
Between PKR 50,000 and 100,000	10.95
Between PKR 25,000 and 50,000	40.8
Below PKR 25,000	45.27

Fig. 15. Access to Electronic Devices/ Internet/ Electricity (Students in KP Higher Secondary Schools & Colleges – Peshawar & Abbottabad

Access to Electronic Devices/ Internet/ Electricity (EDUCATION)

Category	Among Female Respondents	Among Male Respondents	Among All Respondents
Access to 24 hrs of Electricity	7.64	51	26.37
Access to internet	53.65	61.53	55.22
Possession of Computers/ Tablets	54.47	55	54.73
Possession of Smart Phones	39	48.71	42.79

As opposed to the west, where the social structure is there to support digital transformation, Pakistan not only lags in social structures conducive to digital transformation, but the use of the internet and information and communication technologies is also somewhat abstruse. The access of the majority of students in Khyber Pakhtunkhwa schools and colleges to the internet (55.22 percent), as shown by the survey data, displays the fast diffusion of internet among the Generation Z (Figure 15). However, this increasing internet penetration does not promise transformation in the real sense, and neither does it closes the gap of the digital divide among the different social

groups. The females have even lesser access to digital devices and internet connections. The accessibility issues are correlated with the use of online forums by students to communicate with their teachers. The majority of the students (64 percent) agreed to have used some form of an online forum to communicate with their teachers and the most widely used was WhatsApp (65 percent) (Figure 16). However, around 34 percent of the students had never used any online means to access their teachers. This is despite around 43 percent possessing smartphones and 55 percent having either computers or tablets.
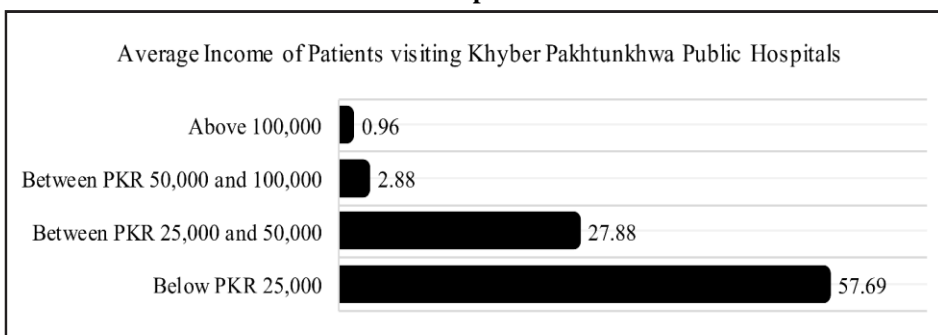
Fig. 16. Online Forums of Communications Between Teachers and Students in Public Schools and Colleges

Online Forums of Communications between Teachers and Students in Public Schools & Colleges

Zoom	0.50%
Google Classroom	2%
Facebook	2%
WhatsApp	65%
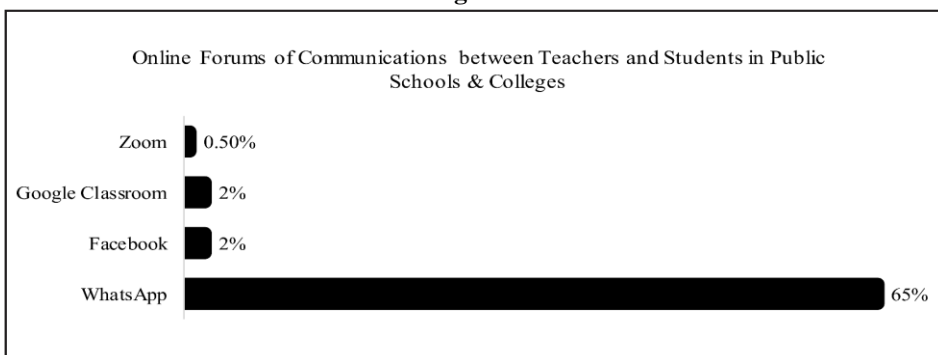
The overarching dependence of teachers and students on WhatsApp to deliver lectures and communicate shows the low level of teachers' and students' confidence in their digital competencies and the inability to use more formal means of communication and lecture-delivering forums such as Zoom, Google Classroom, etc. It also indicates the incapacity of the school/ college strategies to support ICT integration in teaching and learning that was promised by the education department officials through the introduction of the LMS in schools and colleges.

In digital health and accessibility, officials argued that the very fact that the government charged just Rs. 20 as token money for OPD services in public hospitals is a pro-poor policy that increased poor patients' accessibility to these hospitals. The quantitative survey analysis brings home the point that the public hospitals are visited by mostly very poor patients with a majority (57.69 percent) having an average income of less than Rs. 25,000 (see Figure 17)

Fig. 17. Average Income of Patients Visiting Khyber Pakhtunkhwa Government Public Hospitals

Average Income of Patients visiting Khyber Pakhtunkhwa Public Hospitals

Above 100,000	0.96
Between PKR 50,000 and 100,000	2.88
Between PKR 25,000 and 50,000	27.88
Below PKR 25,000	57.69

Accessibility (in terms of expenses) of poor patients was further increased with the lower cost of tests, resulting from the digitisation of films in radiology. The inclusivity issue was somewhat addressed through the government's '*Sehat Sahulat Card'* that made health care affordable for patients by providing support to health care expenses of patients in hospitals that were near to their places, which also prevented overcrowding in main hospitals in cities. According to officials, health care was becoming more inclusive and accessible through online services, such as online doctor appointment facilities and patient access to medical data online**.** It was revealed that the patient had only access to his pathology reports, which he could download at his convenience in his home (Health Department Officials).

However, the patient's use of ICT tools for health services was hampered by traditional ways of accessing health care services. The patients, as argued by the health officials, still preferred to access health care in public sector hospitals physically, because of the existing culture of in-person visits to hospitals and because of their low educational levels, which hampered knowledge of and usage of ICT tools. The survey outcomes also showed that the majority of patients accessed the doctors through forums other than online. This was also because the online doctor's appointment option on the hospital website is meant for the inpatient department (IPD) and it was not functioning for OPDs conducted in the morning. The online appointment system is available only for the Institutional Based Practice (IBP) of doctors under the Khyber Pakhtunkhwa Government Medical Teaching Institutions (MTI) Reforms Act 2015. When asked about the mode of getting doctor's appointments, a considerably high majority (91.35 percent) stated that they do not get doctor's appointments either online or through telephone service, instead they preferred to go to the hospital and register personally through '*parchi'* in hospital OPDs (see Figure 18).

Fig. 18. Mode of Doctor's Appointment
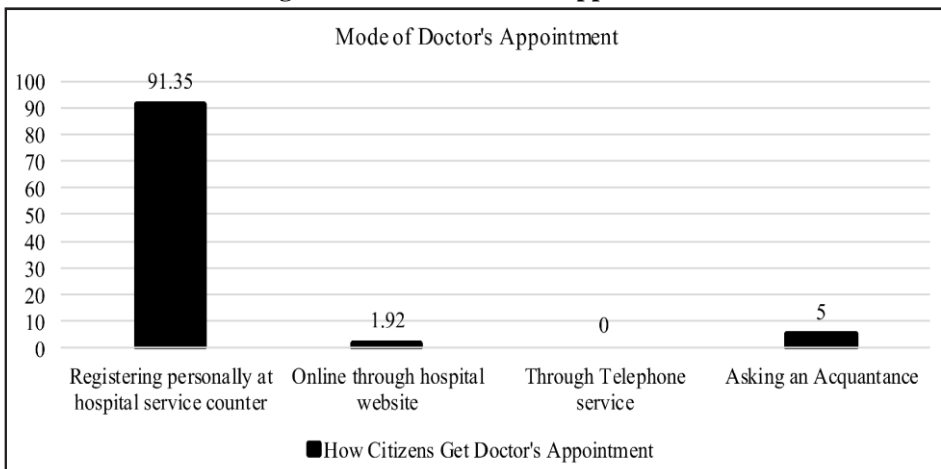
The issue of doctor's online appointments is an important part of a hospital's online presence. Survey results showed that 30.77 percent did not trust the online doctor's appointment system for accessing treatment in a hospital, and most respondents

(44.23 percent) were undecided and could not make up their minds as to trust the system of online appointment or not. Only around 25 percent of the respondents showed their trust in the online doctor's appointment system (Figure 19).

Fig. 19. Survey Response to Online Doctor's Appointment
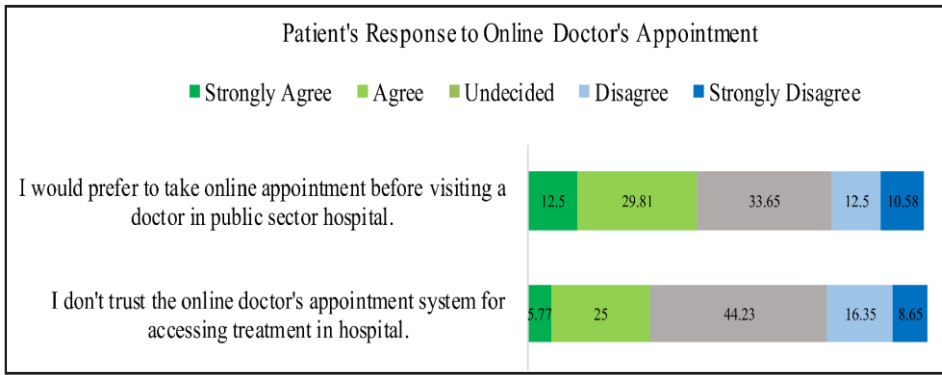
The survey showed interesting results on the issue of online access to medical reports. Most of the respondents (46.15 percent) were undecided on whether the public hospital should provide them online access to their medical records, including test reports. However, 44.23 percent of the respondents reported that they would like the hospital to provide them with online access to their medical records and test reports. For inclusivity and marginalised population's coverage in health, there was optimism among officials that ICTs can achieve these goals provided the local BHUs are equipped with proper infrastructure and internet availability was ensured to connect patients with hospital consultants. On the end user's side, the accessibility issue was hampered by citizens' access to electronic devices, internet facilities, and electricity (see Figure 20).

Fig. 20. Survey Outcome Showing Patient's Access Levels
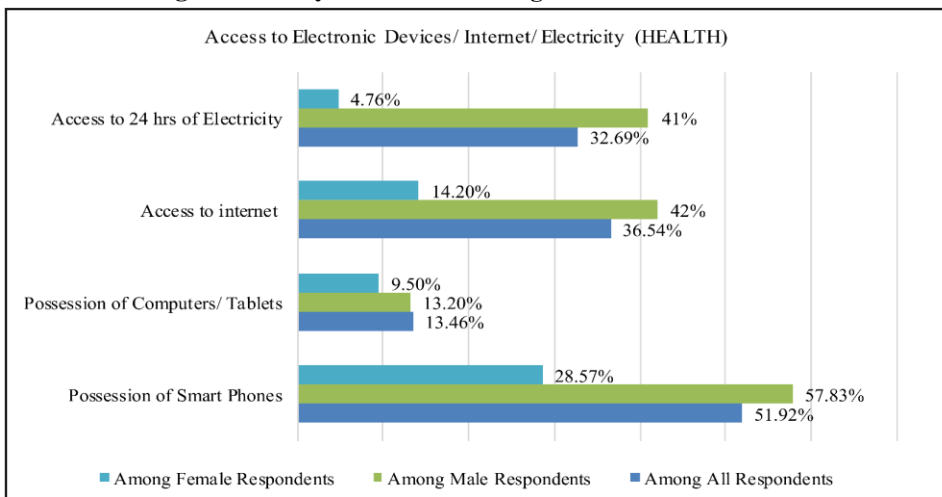
6. ISSUES HINDERING E-GOVERNMENT EFFORTS IN EDUCATION AND HEALTH

There is hesitancy, skepticism, and latent resistance among the bureaucrats about the digitization initiatives and related impacts. For example, some believe online education cannot be a replacement for interpersonal and face-to-face teaching. Others display overt technological shyness by arguing, "*... personally I think people do not like the use of ICT tools.*" Still, others contend, "*it is not an easy job…it involves many factors…it is not just technological change, but also a behavioural one.*" Some also give the example of e-office to argue that technology was ineffective because of its *"complicated nature" … "You will have to scan documents and then officials would write on them and then it would go to the other higher official in a long chain but writing comments on such files is a complicated business."* Therefore, a lack of skills was indicated to be the main concern. Officials also lamented the fact that most people who were oblivious to the potential and importance of ICTs were occupying the strategic policy-making level posts inside the government. In health too, though high levels of enthusiasm were reported for ICT tools among the service providers, however, change management issues were also reported. For example, hesitancy on the part of hospital staff in using computers, which was reportedly being overcome through regular IT training. Some officials admitted that the e-file system was not running very effectively in the education department, because of the clerical staff's unfamiliarity with the system. This was probably because the in-service training for these clerical staff was not properly managed. The organisational culture in schools was reportedly changing due to repeated teacher training imparted to teachers in schools where smart boards and computer labs were introduced. *"… the teachers are no longer afraid of using ICT tools in teaching. People's expertise with the software is improving…"* said one official. The NTS-based appointments and higher levels of education among teachers were also helping to reduce technological shyness.

Some of the officials linked change management issues in education to the ICT savviness of their secretary-level bosses, giving examples of how some of them through persistent direction and monitoring were adamant about making the ICT interventions a success. A few also argued that there is less bureaucratic hesitancy for such ICT initiatives that do not involve drastic policy changes. Officials also mentioned technical issues and glitches resulting from the first-time usage of ICTs to conduct official business, such as online meetings during Covid 19 emergency; to quote one official, "*I haven't attended even a single online meeting that did not run into problems.*" In health too, technical glitches were reported to be impacting the systematic entering and use of data in some cases. Issues with internet connectivity at local levels also delayed the process. The context of outdated machines which did not support ICT initiatives in health was also pointed out as one aspect of the problem. The deficiency of technical staff, especially data entry operators (DEOs)' at district-level BHUs was also reported. Despite resistance to ICTs, a technology culture was being developed in some areas because of the mandatory nature of work, such as the district education officials (DEOs) must regularly log in and report to their bosses and in case of non-communication, are reprimanded. Similarly, the case of e-transfers shows that since there is no alternate way of registering transfer cases for school and college teachers except online; therefore, it

has now become mandatory. The same stands true in the case of mandatory online college admissions in Khyber Pakhtunkhwa.

In the case of financial obstacles, there was some hesitation on the part of top-level bureaucrats to admit the lack of resources from the government side. However, we can assume that they did not want to annoy their political bosses by issuing such statements that could be traced back to them. Others who were serving in the middle and lower cadre of bureaucracy were more open to the fact that ICTs could improve service delivery further provided more resources were made available. Some officials downplayed the lack of resources aspect to emphasise the lack of vision of policymakers, which results in a waste of money. In health, lack of finances was argued as a long-standing issue which meant the government always provided finances less than the demand, although some argued investment was undertaken in critical e-health fields. Shortage of funds made the government take recourse to donor funding; such programmes initiated by the government and run by the donors initially for 5 to 6 years are reverted to the government and got 'political ownership,' once it generates a demand among the people. For provincial government spending on education in the last five years, see Table 2.

Table 2

The Khyber Pakhtunkhwa Government Expenditure on Education (2015-2020)

Years	Total Expenditure
2015-16	112,231
2016-17	136,121
2017-18	142,643
2018-19	152,711
2019-20	46,249

Source: Pakistan Economic Survey 2020-21. Government of Pakistan, Finance Division. Page 206. Retrieved December 2021 from https://www.finance.gov.pk/survey_2021.html

The provincial government websites are not interactive as far as the public is concerned. A website may serve multidimensional purposes. However, the Khyber Pakhtunkhwa government websites are focused on information sharing or policy presentation and service delivery. Many of these are not fully modernised; the outdated data on the websites provide little information to citizens. Some websites do show proactive disclosure of budget estimates (such as the ST&IT department) but mostly it is not current or contains information on the remunerations of the officials only. Similarly, attempts to avail the services portal links show errors or the contents don't get displayed. The use of websites as a deliberative or co-production channel (Lee-Geiller & Lee, 2019) is, therefore, overlooked. Citizens passively receive information or services but are denied feedback mechanisms, resultantly, the consultative feature of the websites is ignored. The primitive nature of government websites is further impaired by the poor internet services in Khyber Pakhtunkhwa.

The e-government initiatives make use of ICT tools and applications, which necessitates the availability of high-speed internet and access to mobile devices by the public for effective utilisation of public services. Given the fact that the majority of the Khyber Pakhtunkhwa population (83.1 percent) lives in the rural areas and a quarter (16.9

percent) in the urban areas (PBS, GoP, 2017), only around 15.1 percent of the rural population has access to internet connection and 41.9 percent urban residents have internet availability (ASER, 2019). The survey results also underscore the issues of lack of access to mobile devices by the public. In the year 2020, Pakistan imported 24.51 million phones, compared to the locally manufactured capacity of 13.05 million (Arab News, January 25, 2022). Add to it the 'regulatory duties' (between 32 percent to 240 percent) that were imposed by the Federal Board of Revenue (FBR) on the import of mobile phones in 2021 (Rana, July 2, 2021). Additionally, the Government of Pakistan imposed a 17 percent tax on mobile phones in the Supplementary Finance Budget on January 15, 2022. The newly imposed tax led to a price hike of approximately 30 percent above the original price (Digital Rights Monitor, 2022) of these phones, deviating from the government vision of a 'Digital Pakistan.' The non-affordability of cell phones coupled with the non-availability of an internet connection is the key restraint for citizens to utilise online public services. The once-upon-a-time rendition of access to technological devices being a luxury has undergone significant change, especially during the Covid-19 emergency period. 'Digital Pakistan,' therefore, needs 'digital access,' which is only possible with affirmative digital policies that ensure digital access and reduce the digital divide in the country.

7. CONCLUSIONS AND POLICY RECOMMENDATIONS

The Khyber Pakhtunkhwa Government's ICT-driven interventions are promoting values of efficiency, transparency, and inclusiveness in service provision. Efficiency in service delivery in terms of better management of resources, quick delivery of services, and provision of quality services; transparency as openness of government information to the general public; and justice as the value-ethic of government agencies is shown in its principle of inclusivity - the ability to provide services to all regardless of their language, religion, culture, ethnicity, area of habitat, political affiliations and above all their social condition. An in-depth search for reality as to whose interest these ICT technologies serve and who is excluded or included is critical. Just as Kühn (2019) is worried about the dominant narrative in education technology of finding out and implementing universal technological solutions supported by the inventions of Silicon Valley. He calls these narratives deterministic in their approach. This deterministic approach encourages forces other than our free will to govern our behaviour; the Khyber Pakhtunkhwa government's digital policy narrative about its capacity of transforming the government 'apparatuses,' mechanisms and processes, are regulating and supervising our actions/behaviours over which we have no control. Canguilhem 'recognises the logical primacy of the abnormal over the normal' (Pasquinelli, 2015); adopting his stance, one can say that the manual disposition of work by bureaucracy has become 'abnormal' according to the 21st century reinventing government narrative of David Osborne and Ted Gaebler. So, to bring this 'abnormal' to 'normal', digital interventions are necessary. Digitisation hence becomes the new normal; any defiance will be regarded as abnormal. This brings us to what the technological determinists would say that technology compels people and institutions to behave in certain ways (Johnson & Wetmore, 2009).

The findings of our surveys and interviews suggest that a managerial model of e-service delivery prevails in Khyber Pakhtunkhwa, where the citizens are seen as passive

customers and are primarily at the receiving end. Though the ICTs have brought quantitative improvement in previous technologies, however, online citizen participation to avail of these services is largely in the form of a one-sided flow of information to the citizens as their input on the quality of services provided is almost non-existent. Citizens' connectivity with the government is one-sided with information displayed on government websites. Only a few online feedback portals are available, which are almost rarely used. This practice runs against the real aim of digitisation, which is to increase citizen participation, and to make policy making and formulation with citizen's input; however, the findings suggest that there is no input of citizens in policy formulation. It means that the digitisation era is a continuation of the New Public Management Model (NPM), in which the government adopts and applies a business model to deliver services. Service delivery is made synonymous with business relationships; citizens are customers, whom the government must satisfy. Here, the service providers assume the character of businessmen who are trying to gain profit, not necessarily in terms of money but in the form of public support or public trust.

It is not without saying that technology is bringing transformation in the way people access and bureaucracy administers services. For example, college admissions in Khyber Pakhtunkhwa have gone online in the last few years. It has been accepted as mandatory and, therefore, is more prevalent and positively rated, as the survey data suggests a positive review of this app. For other apps and e-services, which are not mandatory, there is less penetration and selective usage by the end-users. Technology's use, therefore, could not become as common as was envisaged in the government policies.   We can also argue that connectivity is indispensable for democracy as information and communication technologies are considered to be an essential requisite for freedom- the freedom to participate. As Anthony Wilhelm explains that the ends for which IT is used and people's access to it will determine the influence of technologies in democracy and politics in the real sense (Wilhelm, 2000, p. 149). In line with what William Dutton, argues, *"Digital government can erode or enhance democratic processes … (but) the outcome will be determined by the interaction of policy choices, management strategies, and cultural responses—not by advanced technology alone…"* (Dutton, 1999, p. 193), we can also conclude that digitisation's impact on service delivery is more a function of critical policy choices, change management strategies, and public access to ICT tools.

The digital interventions in Khyber Pakhtunkhwa demonstrate a unilinear flow of information and services from the government to the citizens. The government's emphasis is on service delivery and policy presentation. Care is taken that there is fast and efficient delivery of information and that is also sugar-coated to make it desirable or acceptable to the people. Each department has its slogan, such as '*Badal Raha hey Khyber Pakhtunkhwa'* (Khyber Pakhtunkhwa is changing), 'from pen to pixel', 'policing by technology', and 'technology is our new ideology' to mention some. This brings the provincial government's digital initiatives under the domain of the managerial model of e-governance. Second, bureaucratic change in conduct is not significant. ICT-induced transformations in the bureaucracy's organisational culture have led to resistance and scepticism of the ICT-introduced reforms. Third, digitisation has led to the expansion of government departments, which is an old phenomenon. Several adjacent structures have

sprung up alongside the already existing sections. Expansion in the size of the public sector is seen in the establishment of new departments, sections, units, etc., such as the PMRU, EMA, HMA, EMIS, HMIS, and others. It is expanding the power of the government, although digital transformation is projected as empowering the common man. We may say that it has led to the diversification of the old homogeneous bureaucracy – a new class of bureaucracy with new patterns of conduct, real-time data calculations, new rules, and modus operandi. To sum up, the provincial government's digitisation scheme is still at its take-off stage, and it will require proper investment, a commitment of the policymakers, and the adaptability of the service providers and the end users for making the journey worthwhile.

The following policy implications and recommendations are suggested:

- Much needs to be done to involve citizens in the participatory practices of e-governance, where the citizens are not just involved in utilising digital governance steps for citizen complaints and redressal, but also play their roles in policy formulation and direction. For this to be practical, the IT wings (HEMIS, EMIS and HIS) of both education and health departments must engage citizens in the process of online consultations before an app or digital service is launched. It is important to mention here that such online consultations may be popularised through social media projection.

- It is not without saying that transparency's starting point is the availability of open sources of information, easily accessible to the public on their websites. Therefore, there is an urgent need to update the websites of both the health as well as education departments. This is essential because the websites of both departments contain mostly outdated information or some very basic set of information. Here, the responsibility of updating can be tasked to the department's respective IT wings. For this purpose, data administrators specifically tasked with uploading the current set of information on government websites can be hired and tasked with uploading new information every fortnight.

- Pakistan had by 2016 declared its intention to join the Open Government Initiative and undertake fiscal transparency, however, no major plan has been initiated so far (The World Bank, 2019, p. 79). Therefore, another policy recommendation is that the government, including the Khyber Pakhtunkhwa, must ensure online access to the public about the government's financial statements relating to various expenditures and on various projects. This is imperative in achieving the goal of transparent service delivery.

- There is under-utilisation of service generation apps because of public awareness issues. Therefore, it is recommended that the government should seriously project its new as well as old ICT initiatives on social and print media platforms and educate the public on how such apps may be optimally utilised. The task is attainable through engaging the already available departmental PR and media officials or spokesperson, entrusted with the responsibility of proper projection of digital tools in service delivery. It is also recommended that the concerned departments can hold small seminars and workshops in educational institutions, especially higher secondary schools and colleges to train and

educate the students and teachers about the potential usage and benefits of such apps. Awareness campaigns can also be generated through primary school teachers who are in a better position to motivate and educate their communities on specific benefits to gain from accessing service generation through such apps.

- This brings us to our next policy recommendation for how to bridge the digital divide. There is a serious problem with affordability of digital tools on account of differences in socio-economic backgrounds. Hence, students must be provided with very subsidised microcredits for the purchase of computers and tablets. Pakistani companies can assemble or make basic tablets at low prices for consumption by low-income households aided by the government concessionary tax regime.

- Public sector school children are exposed to computer education from secondary and higher secondary levels, which given the importance of IT learning at an early age is a very late exposure. Computer studies must be introduced in public sector primary and middle schools as a compulsory subject. Even at the secondary and higher secondary level, the computer is an optional subject, which in turn is directly related to the lack of essential infrastructure in all schools. Here, mandatory intervention in making the computer subject compulsory and provision of essential infrastructure at all levels of schools is imperative.

- Agreements with cell phone companies for student packages or teaching packages for school and college teachers is also a desirable step; this has been attempted by the Government of Pakistan in the case of successfully running the online admissions system for colleges; the service was generated with the help of a renowned cell phone company.

- One suggestion is for the Khyber Pakhtunkhwa government to combine the efforts of its various IT-focused departments under one IT ministry and task the same with developing, implementing, and assessing the ICT tools. In its current form, the Khyber Pakhtunkhwa Information Technology Board (KPITB), the Science and Technology & Information Technology department (ST&IT); the Directorate of Science and Technology (DoST); and the Directorate of Information Technology (DoIT) all perform some overlapping set of functions.

- An essential aspect to overcome resistance to ICT usage among the officials is regular on-job IT training. The fact of the matter is that the e-filling system failed to take off in many government departments because of clerical staff and officers' unfamiliarity with it. Such training can be managed by those specialised cells, which either are taking care of HMIS and EMIS systems within the health and education departments or by affiliate institutes that have specific mandates on training, for example, the Directorate of Professional Development in the Education Department. In big MTI hospitals, there are already IT sections functioning and they have reported on providing regular IT training to hospital staff.

- In the field of education, remoteness and accessibility issues hinder student's access to tele-education apps; it is suggested that since the PTV has wider access across all regions of Khyber Pakhtunkhwa, therefore, its services could be

utilised by the KPESED as well as the HED for coordinated efforts at televising quality course contents teaching for school and college students to follow.

- In the realm of digital health, one important aspect missing is e-referrals in hospitals. If the MTI hospitals in major cities want patients to access their local BHUs and district hospitals first, especially for common illnesses, the patients and doctors must be connected digitally with specialists in big hospitals. Since the government has already provided technicians in BHUs with tablets, and there was also planning underway for installing fixed tablets for disease monitoring, the same can also be utilised to connect district hospitals and BHU patients electronically with the consultants and doctors in a tertiary hospital. This will lessen the burden on major hospitals and encourage people to access basic health services in their hometowns.

- Another policy recommendation is that there must be inter-provincial sharing of best practices in ICTs and service delivery. The coordination between these IT departments will also help them learn from shared experiences and avoid failures from any new experimentations in ICT-induced service generation initiatives.

- In Pakistan, there is a lack of mechanisms that could assess the effects of the new technology interventions in the different sectors. There is a need to introduce 'technology assessment' to aid policymakers by providing them with information about the possible impact of new technology and assessing the short and long-term consequences of old technology. Technology assessment is a form of policy research that will provide policymakers with information on policy alternatives.

The primary object of this research project was to explore how the use of information and communication tools (ICT) is affecting efficiency, transparency, and inclusiveness in service delivery by the provincial bureaucracy in Khyber Pakhtunkhwa and making it undergo organisational and cultural changes in the Education and Health Departments. The introduction of Information and Communication Technology (ICT) tools in the governance of Khyber Pakhtunkhwa province has been a unique experience with policy making in this otherwise economically and socially underdeveloped province. The findings of the study suggest that significant digital interventions were made by the provincial government in both the education and health sectors. Pushed further by the Covid 19 emergency, these interventions stemmed from an understanding of generating evidence-based policies derived from data to enhance the efficiency and transparency aspects of service generation. The ICT-induced impacts on service delivery gravitated towards increased efficiency, time, and resource-saving as well as greater transparency and improved accessibility of both the education and health sectors. However, some major issues impaired the sustainability of digital interventions; change management in bureaucracy being one of them, which led to bureaucratic resistance and scepticism of the ICT-introduced reforms. There is underutilisation of the e-initiatives by the end-users in education and health as identified in the survey outcomes. The reasons can be the lack of awareness among citizens about these initiatives, insufficient digital skills to utilise these services and the context of the digital divide as around half of the respondents have no access to digital tools to access services. Hence, the desire for providing efficient, transparent, and inclusive services through ICTs is hampered by many challenges.

The research identifies the different elements that challenge the smooth implementation and sustainability of the ICT projects in Khyber Pakhtunkhwa Health and Education departments are evaluated in the following table (see Table 3).

Table 3

Elements that Influence the Implementation of e-Government Initiatives in Khyber Pakhtunkhwa Health and Education Sectors

Elements	Challenges
Lack of Awareness	Lack of awareness among citizens of the digital initiatives introduced by government to improve service delivery. As a consequence there is underutilisation of the digital services by the citizens which effects the sustainability of a particular project
Technical Glitches	Internet access/ speed/ bandwidth, unstable power supply
Change Management	Government employee resistance to technology in the wake of limited training (e-readiness), less resources, absence of legal framework, ownership issues/ lack of vision among departmental leaders, lack of inter-departmental coordination, no or insufficient sharing of information among ministries.
Lack of Legal Framework	Issues relating to cyber security(data security), digital signatures on files, personal data protection (data privacy), confidentiality, sharing of best practices among provincial departments.
Access Issues and Digital Divide	Lack of access to electronic gadgets especially among females, lack of required digital skills to use digital applications to access services.
Resistance, Cultural Attitudes	End-users insistence to physically access the services by visiting the government offices; the patients reluctance to access their medical data online.
Political Element	Frequent change of high level officials and sustainability of the ICT projects, the government priority, no or low involvement of stakeholders in policy making.
Human Resource	Limited sharing of information (transparency), insufficient or untrained wok force.

The desire for a more efficient, transparent, and inclusive service delivery through ICTs is hampered by the above-mentioned challenges. Citizens' perception of their government's commitment to improving service delivery through the ICTs is rather negatively related to their mistrust of their government in the education sector (survey results). In health, however, citizens have greater trust in the commitment of their government toward efficient service delivery through e-health initiatives. There is underutilisation of the e-initiatives by the end-users in education and health as identified in the survey outcomes. One reason can be the lack of awareness among citizens about

these initiatives, insufficient digital skills to utilise these services and the context of digital divide as around half of the respondents have no access to digital tools to access services. The access issue is further aggravated by their income status, with the majority (57 percent) belonging to low-income groups (See Figure 21).

Fig. 21. Survey Respondents' Income Availing KP Public Sector Health and Education Facilities
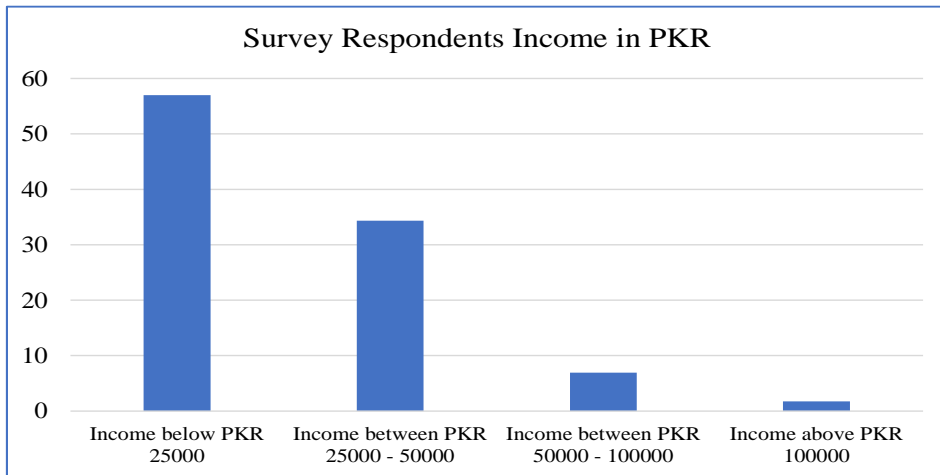
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