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ELECTRONIC RECORD MANAGEMENT AND ITS EFFECTIVENESS IN THE LOCAL HEALTH CARE ORGANIZATION OF PAKISTAN

Master's thesis
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ABSTRACT

Even in the age of technology, the state of record keeping in most government organizations in Pakistan remains behind the date. Lack of IT infrastructure and resources have been cited as reasons for using paper-based record keeping.

In this study, the case study method is used to gain insights into the current state of record-keeping in the country and the challenges/challenges that arise while implementing a record management system (ERMS). As a way to promote the idea of Good Management along with transparency and accountability, suggestions and next steps are discussed for implementing an ERMS system effectively is presented as the development of record policies, development of the business cases, IT training programmes.

The case study investigated the effects of open-source software on a government hospital in Pakistan. Sources of qualitative data were expert interviews and employee questionnaires analysed using a data analysis tool (RQDA). Findings from the analysis confirmed that the absence of electronic records leads to an increase in mortality and morbidity, which, in turn, hinders transparency and good governance.

The research suggests that to effectively enrol ERMS in, it is must to first measure the e-readiness of that organization, significant change that an ERMS can bring. It is imperative that the organization update its IT infrastructure by implementing updated systems and networks to enable an efficient ERMS implementation. All staff members from management to nursing staff should be trained. Prior to overcoming obstacles, it is important to identify them. Legal instruments should be used to ensure the regular update of systems.

Keywords: Record keeping, ERMS, Good management, Civil Hospital.

INTRODUCTION

An undesirable factor to know the rate of growth of a developing country is to assess that how much its societies can adopt new systems and concepts. Since the practices of allopathic medicines have started, doctors and nurses are used to keeping detailed notes for history, including signs and symptoms, cure, treatment, and prognosis of the patient on papers which is often pliable to security threats, losses, damages, shortage of storage and does not allow easy diagnosis and the making of the treatment plan. In this era of the new century, uncountable usages of technology have emerged and have made our life much easier than before. The use of technology in the field of Organisations, especially Health care, have very vast meaning and have emerged as a revolution that can be observed easily, such as robotic surgery minimising the chance of human erro.

The research analyses the current situation of Electric record-keeping management in government organisations of Pakistan, its management challenges, and hurdles. For this purpose, the author chose to perform a study in Civil Hospital Karachi. To make the performance of Hospital better and help in regaining its image.

The research is done to suggest that implementation of an Electronic Health Record system can improve the quality of care and treatment provided. It may lead to an increase in exact treatment and a decrease in the rate of death among patients because of availability of health records every time when needed.

The record keeping method in Pakistan is manual and there are resistance and obstacle to adapting Electronic Record Management System (ERMS) in Civil Hospital Karachi. According to research in Hospitals of Karachi the poor state of record keeping can be seen in the fact that only nine of the 136 hospitals have record keepers on staff. JPMC has eight, and CH has one. This displays a lack of interest on the part of the administration to develop a proper record keeping system. Furthermore, more than 90% of the departments in this study did not have computers for record keeping, and records were being kept manually on registers with pencil/pen. (Aziz, S., & Rao, M. H 2002)

Studying this topic is incredibly important for developing countries like Pakistan, where a lack of basic IT infrastructure and record-keeping has resulted in a multitude of complexities and challenges. Furthermore, the results will serve as useful information for the enrolment of ERMS at the Civil Hospital in Karachi. According to an important part of information quality is making sure that data are accurate and complete, ensuring excellent information access, verifying the continuous availability of data, and increasingly, guarantee patient privacy and confidentiality.

This research provides the significant approach for the development of electronic record keeping systems in health care sector. ERMS is not sufficiently introduced in specific regions of Sindh. The health care staff are positive to introduce digital patients' cards.

The research questions

RQ1: Can government hospitals effectively implement Electronic Record Management System (ERMS)

RQ2: How can the Civil Hospital Karachi overcome the barriers to implementing Electronic Record Management System (ERMS)?

RQ3: How an electronic record management system can increase the efficiency of the daily workflow.

RQ4: How can we overcome resistance to change at the Civil Hospital Karachi during and after the adoption of the Electronic Record Management System (ERMS)?

Theories applicable on thesis

This research is mainly based on two theories of management which are following and will be explained in literature review section.

1. Lewin's Model of change management. (Le T.T 2006)

2. Human relations and behaviour theory (Karanika & Biron, C.2020).

The thesis focuses on applying the critical systems of government to underdeveloped countries to promote the concept of "good management". The reason is that good management is the most vital part of providing services that meet requirements and that the management system is effective. As it is observed that the key to modern governance is not only efficiency, but also accountability

between citizens and government. The point of the theory is to ensure that the citizens of a state are treated not just as consumers or customers but as legitimate citizens of that country. So, it is a theory that establishes some basic principles. These principles include accountability, transparency, economy, and efficiency etc.

There are inherent risks to digitalized information, including bit decayed, which occurs when stored files become corrupt over time, media that is no longer in use, obsolete hardware, and there are not many computers or systems available, which makes it very difficult to access a digital file and replace it and obsolete software, and an outdated operating system can no longer do anything with the data making them disappeared, and the originality of the data is no longer available (Groenewald, 2011).

As Liu (2011), before and after process of implementation of an ERMS system, the following policies need to be flourished and up to date to secure the protection of data, particularly in a government agency (Figure 1).

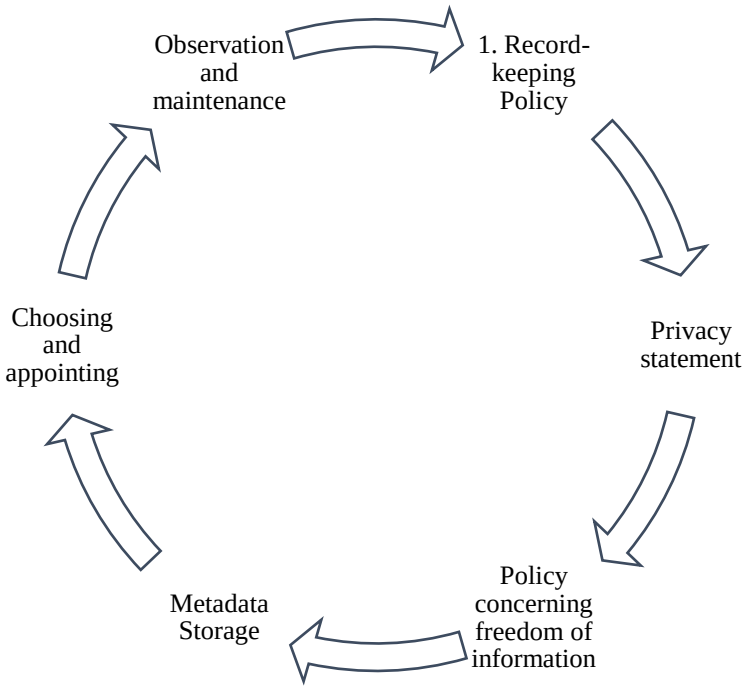


Figure 1. Cycle of implementation of an ERMS system
Source: Liu (2011), author's depiction

According to Liu While implementing ERMS, first step is to make record keeping policies according to organization's situation, privacy statement is an essential factor so that sensitive data regarding customers can be protected and remain concealed either. This needs selection of a

compatible software for metadata storage. Next step is to apply the system and regular upgrading and updating of software accordingly.

Research methodology

For this research Mixed Method is used. Data are drawn from the environment that the author does not control. The main source of data collection is Interviews with Management and higher staff members which are analysed through Thematic Analysis with the help of free software RQDA, . Also, a survey (n = 30) was done with junior doctors, nursing staff and helpers through google forms, results of which are analysed through Descriptive analysis method and through SPSS software. The data gathered from the library for research worked as secondary data. An extensive literature review referring to highly cited research papers and books was done. Both, the interview manual, and the questions for the survey are attached in appendices.

Chapter 1: Literature review, covers an extensive review on literature about record keeping and electrical record-keeping, ERMS challenges in Pakistan, IT literacy and poverty, legislations about record keeping in Pakistan. Chapter 2: Research methodology, describes the methods used to collect data and then analysis for studies. Chapter 3: Results and Discussions, discusses the results gathered by interviews and survey and the results of the analysis, focused and structured according to research questions. Chapter 4: Conclusion and Recommendations, focus on research problem solutions, also, it gives an overview of future work after the implementation of ERMS.

1 LITERATURE REVIEW

There is a theory-based approach to library research. Clearly, the research problem is based on literature, and enables discussion of vivid material, as well as a comparison of the theories used in the study. The intent of the library research is not to make a judgement, but to examine the merits of the theories. Using the library research method produces secondary data, which refers to data that is readily accessible and willingly retrieved to anyone. It also means that the data is not directly collected but taken from published and unpublished sources (Liamputtong, 2005).

1.1 Electronic records management system (ERMS)

Records serve as a tool to keep track of abundant events therefore they can be used as a management tool. Record-keeping systems have evolved since businesses switched from writing by shafts to typing. Information is more easily retrievable, easily identifiable, and economically manageable with appropriate document management (Cho, 2010). All these systems were left behind by the introduction of entire technological change. Due to technological advancement, record keeping was converted to computers (Mihlrad, 2010).

According to Thurston (1997), records keepers or record managers manage, create, maintain, use, and dispose of records throughout their life cycle. In any public sector organization, record management is essential because records contain the "institutional memory". Records management is used to establish internal and external accountability. Effective implementation of ERMS, a government can deliver services more efficiently (Teadusinfosüsteem, 2019). EDMS is more often mixed with ERMS because of the quality functionalities. EDM systems control and generate electronic documents to enhance workflow (Nguyen, 2007). ERMS, on the other hand, focuses only on managing the electronic documents that are essential for data retention. EDMS is a system in which change of data is allowed, while ERMS does not allow changes to retained records. Similarly, in EDMS, owners can dispose of documents, whereas in ERMS, records cannot be deleted unless they are included in the disposal schedule. ERMS also has a process by which the structure of stored records is maintained. It supports the day-to-day operations of an organisation,

but it is also customised to provide a secure storehouse that required data can be access upon need. This increases the output quality of an organisation and helps in keeping accountability.

1.2 Pakistan’s record retention policy

Social loafing has been an interesting topic for numerous theoretical and empirical academic research to decrease its behaviour and to keep the group motivated. Each research has its own unique problem to solve, and those works cannot help us to understand remote work enforced by Covid-19. However, they can assist to identify certain behaviours linked to social loafing and propose how to diminish their effects. Group performance has been studied from different aspects; some scholars studied how to increase it while some others concentrated their work on the identification of effects causing group performance drop. They would be reviewed all together here as they have a potential to impact results and change employee behaviour while working remotely.

Pakistan's current IT policy aims to utilize information technologies to make a positive impact on the nation's development. According to which, both the provincial and federal governments must engage to projects that help implement technology in government. This is done to gain in the government departments' areas which are currently lacking. E-commerce regulations passed in 2002, for example, allow companies to digitally exchange documents with electronic signatures (Blythe, 2006). By passing the ordinance, the Government of Pakistan has taken a step towards computerized government services, which in turn will lead to more efficient operations.

The ministry's current system of record-keeping may be outdated, but the guidelines are in place to ease the implementation of IT. All data entered used to be kept written in a paper-based system (Kundi, 2009). However, this system was developed almost a decade ago. Just like the other units of the Government, the Sindh government and its second fiddle departments like Civil Hospital Karachi also need to reshape the process of data storage. research show that the policies of underdeveloped countries are often not workable or translated into the required actions. This seems to be the case with the various government departments in Pakistan too. The process of making decisions, deciding, and taking action based on those decisions and actions is indeed connected to the government and is expected to be imparted and investigated by other government bodies and non-governmental organizations" (Nanda, 2006).

1.3 The ERMS system in Pakistan

Almost all the researchers carrying out their research on records/data management in developing countries report worrying details due to the lack of electronic drafts and data management systems. In most government agencies, offices generate a lot of documents and emails, according to Yahaya (Yahaya 2002). However, this can be challenging to manage these levels of electronic data. According to the study by (Akotia, 2000), information and communication technologies (ICTs) have become essential means of improving work processes and increasing productivity. The issue of information management, however, is given little or no attention. As well, there has been no progress in determining the reasons behind the changes affecting the credibility of records kept and created in an environment like IT.

According to a study conducted by Zinner (2008) on the implementation of recordkeeping systems in Pakistani ministries, the British created a system nearly 80 years ago that was used by the Punjab government during the 1960s. Keeping paper records became obsolete as government business prospered and responsibilities were assigned to each department at a rapid rate. Zinner and Viborg conclude there is no formal or proper record-keeping process in rooms, desks, or offices where records are kept in the survey and interview (Zinner, 2008).

There is no doubt that most government agencies in Sindh must restructure their processes and reorganize their basic administrative tasks, a limited number of cases and reviews are conducted showing problems and challenges in the field of education are addressed in research. A government agency's implementation of ERMS. Researchers Zinner & Viborg conducted a study on one of the organizations which already implemented an electronic record management system (ERMS), the study explains that there are many reasons for deviation from standard processes are one of the major causes of implementation issues, the study further explains that there is lack of technological information and skills.

It is almost impossible to find similar initiatives in the country. The employees are instructed to follow old manual procedures and shifting to an electronic system means forcing them to technical skills. The target groups needed to manage the change management which need to develop the capacity to manage the process of the adoption of ERMS is still limited in Pakistan, although it has led to increased efficiency and chronological implementation. effectiveness in a few government agencies such as NADRA (Bokhari, 2012). Transparency in accountability and decision-making has also improved with electronic records management Studies claim that the

difficulties related to the change management in any organization are universal and do not depend only on the ongoing situation of each country. In Pakistan, the basic shell for a change is in place. Today, it is necessary to determine whether digital systems are ready to be adapted, as studied by Lazinger et al., (2002), there are many other issues raised by technological information adoption and preservation (Lazinger, 2002). For example, once data is stored on digitalized media, it needs to be relocated to the latest media when the previous one becomes superannuated. ERMS adoption is very important since it ensures that the system is continually updated and therefore has a smooth transition.

Numerous research studies have shown the importance and necessity of implementing ERMS in government departments of developing countries. It would be helpful to develop a process to successfully implement the solution that takes into account all the factors involved. The best ERMS is one that is capable of capturing, maintaining, and delivering evidence of transactions over time as specified by standards and requirements, according to Cunninghum (2008). (Cunningham, 2008) The Civil Hospital is a government organization, as such, it maintains a variety of records, including personnel records, medical records, appointment requests, and employee records. The reliability of the system is thus critical so that it can assist in the evaluation process. It is vital that the necessary technologies and systems are put in place to ensure that these processes are conducted as efficiently as possible ERMs are software applications that allow government agencies to ensure the efficiency of their services and the reliability of their record-keeping processes. Higher departments often store tactful data. It is the responsibility of the Government to ensure that this data is stored in a system that is reliable and provides transparency to the citizens of the state.

Some critical criteria must be examined before an ERMS can be implemented to guarantee that records are received, produced, and managed in accordance with ministry rules. If this is neglected, it might cause issues in a government agency's operations because information is critical for well-ordered operations. As a result, the first stage is to evaluate an organization's e-readiness, as this will determine whether a country is capable and ready to engage in the technological world (Gunnlaugsdottir, 2009). These phases involve establishing a regulatory framework, implementing infrastructural procedures, storing electronic records, managing staffing concerns, and giving training at various levels. The following are the factors to keep in account when installing an ERMS in a developing country:

1.4 The challenges Pakistan faces with ERMS

The cruel colonial rules are to hold responsible for the potential challenges and the merits of the current administrative system. (Srivastava, 2009). Unfortunately, the leaders are still with feudal mentalities, as they were during colonial rule, and are apprehensive to transfer most powers to the local level while still attempting to retain all elemental powers at the central level, which is one of the critical challenges for Pakistan's public administration. Aside from that, some of the most significant administrative challenges are as follows (Arfeen & Khan, 2009; Kashif et al., 2014). In today's world, where the socioeconomic landscape is rapidly changing, for that reason, Pakistan should take positives steps towards legislations that are effective to implementation of constitution. Inefficient legislation in Parliament because Pakistan is primarily ruled by feudal lords who are unaware of the public's major issues. If such issues arise in Parliament, they take far too long to address the solution, which may ultimately lead to even more chaos in administrative work. Pakistan's constitution is rigid by nature and cannot be easily changed. If any legislature wishes to amend any of the constitution's terms and conditions, a lengthy procedure must be followed. Another administration challenge is public-sector corruption and a lack of accountability. The majority of the critical departments are tainted. If a person has additional revenue, he will be given priority treatment; even small tribunals are affected by this threat. One civil service class dominates the entire system, while technocrats are ignored. Most civil servants perform their duties with their own interests in mind, and they believe they are above accountability. Politicians support them due to a lack of pure democracy.

Civil service has a government bureaucracy structure; most countries have morphed their civil service into an organizational chart and prefer technocrats in a same way that the private sector performs. However, a government bureaucracy leadership occurred in Pakistan, which British rulers tried to impose on the subcontinent (Khan, 1994). Although this structure is no longer used in several developed nations, it has been used in Pakistan's civil service. Senior bureaucracy governs highly specialised departments that have no specialized skills in a specific field and operate in conformance with their mindset. This induces work to be delayed and departments to be incompetent. Furthermore, those with the ability to work are not permitted to participate in the department's policymaking. The concept of transparency is rooted in the concept of "free flow of information and dissemination" (Graham, 2003).

Other serious obstacles in Pakistan include financial barriers and a lack of resources (Rehman et al., 2012). Remarkably, even after devolution of resources from the federal to provincial levels in

2010, regional governments have indeed been reluctant to establish the local bodies system. The first reason is bribery, and the second is the political group's authoritarian nature. They are not prepared to disperse funds to a bottom elevation. Local governments or municipal authorities are the first points of contact for citizens in developed countries, but their own existence in Pakistan is still highly questionable. However, under the various federal and provincial governments' programs, development aid is directly transferred to MNAs/MPAs and senators, and also, on event, to private companies. This has severely harmed. This has seriously worn away the local administration system.

Another key aspect is Pakistan's poor literacy rate. Pakistan has a literacy rate of 56 percent, which includes persons who can merely write their name and signature. The main issue is a paucity of educational institutes and teachers, particularly in rural areas. Another long saga of suffering is the high expense of life and the poor quality of education. Families with children choose to send their children to work to make some money instead of to school. The primary factor is unemployment (Latif, 2009).

Population explosion and unemployment are also significant concerns in Pakistan. Pakistan is a country where 38 percent of people lives below the poverty line (Schreiner 2010). People do not have enough money to purchase food. The average monthly salary is much lesser and frequently insufficient to provide the basic needs of all children. In Pakistan, the average population growth rate is 4:1, which indicates that four kids are born for every one that dies (Pakistan Economic Survey, 2015).

Inequitable concentration of wealth amongst provinces and rural communities. Rural residents migrate to major cities in search of work, creating a huge problem. Overpopulation, insufficient energy, a lack of housing, and insufficient water supply is only few of the significant issues confronting Pakistan's administration.

Additionally, a poor infrastructure is limiting the provision of effective public system that meets the needs. In public sector offices, the notion of information technology (IT) is still unfamiliar; the old filling technique is still in use, and so is the manual registration system on paper. Numerous cases reported in Pakistan where information was damaged and no backup was stored. Numerous civil officials are unable to operate computers. All public sector departments must accept technical development (Ahmad et al., 2013).

1.5 Electronic readiness

As evidenced by the literature on e-readiness evaluation, there are no set standards for assessing it. Certain instruments, on the other hand, aid in evaluating e-readiness and can be classified into two broad categories. The first tool evaluates a country's fundamental infrastructure and decides if it is suited for implementing technological adaptation.

The second instrument measures a firm's competitive advantage to benefit through ICT. The few studies which have been conducted on Pakistani government agencies' e-readiness reveal a shortcoming in both training and user interface design. Even while recent government policies support the foundation and infrastructure of information technology, there is still a dearth of policies and processes for implementation. Additionally, it has become critical to establish an environment that encourages individuals to acquire IT skills (Qureshi, 2014).

The attitude and intentions of healthcare professionals regarding the use of technology also need to be considered before technology is effectively implemented in every hospital setting. (toufeeq & Mashood, 2022)

1.6 Infrastructure information technology

The primary issue in the majority of emerging countries is an inadequate infrastructure. The IT infrastructure is a vital part of a department's e-readiness. The researchers find that it is a vital factor contributing significantly to successful implementation. The term "IT infrastructure" refers to the technical underpinnings of information technology, including hardware, communication technologies, software, and fundamental applications, as well as the users' capacity to use these applications (Husain, 2000). The sustainability of an organization's IT infrastructure is directly proportionate to the success of its ERMS deployment. Sindh's government has taken various measures over the previous decade to develop its information technology infrastructure. However, much work remains to be done to guarantee that the necessary infrastructure is in place for the successful implementation of ERMS in government entities such as the Civil Hospital and its wards. Oftentimes, technology and procedures suffer from inadequate of fundamental structure.

1.7 Management collaboration

Additionally, it is critical that senior leadership supports and values the deployment and application of technology in an organization's normal tasks. Support from senior leadership can have both positive and bad implications. Lacking top management support, users may be unable to access the system in question (Simon, 2015). On the other hand, senior management support will facilitate technology acceptance. One of the major issues in developing countries such as Pakistan is the mismatch between agenda and performance. Previous research has found that training personnel in the use of computers and systems is critical for their development in government organizations. However, there is no consensus on this topic in Pakistan, particularly at the Civil Hospital. There is a widespread belief that ERMS or automation processes will create issues. Often, they are unaware of the ability of an ERMS system to improve process efficiency and eliminate duplicate labour performed by staff who would otherwise be responsible for manual record-keeping and communication.

The power of senior management is threatened with the introduction of IT, which is why managers are often hesitant to adjust. According to a review of the DocWerx document management system's implementation in three Pakistani ministries, the system was only installed in one, Punjab Act, after the first twelve months of the effort. It was also discovered that just a small percentage of users in each organization were using the system (Zinner, 2008).

Change management

The author also decides to focus on theories that clarify how to conduct organizational change and measure change readiness. The focus of the research is to look at how ready civil hospitals are to implement ERMS, as well as the hurdles and outcomes.

Change management according to Lewin

As a result of Lewin's Change Management Model, organizational change is a relatively straightforward process. Change and acceptance of change are necessary for organizations to keep up with technological advancements (Le. T.T 2006). However, change is not always easy in an organization. There are three main steps in Lewin’s model (Figure

2).

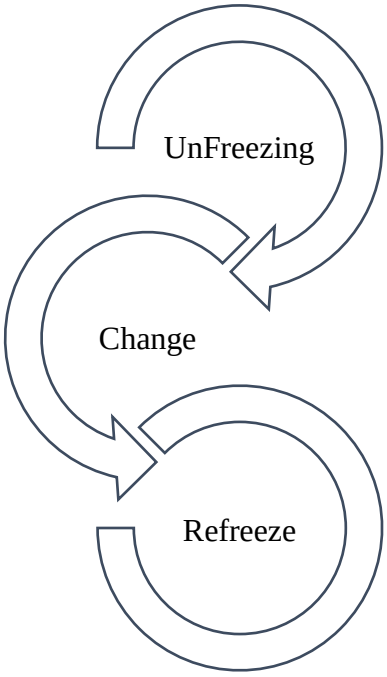


Figure 2. Lewin's model
Source: Lewin (2011), author's depiction

This theory suggests that to effect change in an organization, it is necessary to first unfreeze the established order which is to explain staff about record keeping effectiveness and its advantages to the staff including doctors and nurses. I would be better if various seminars and classes will be conducted to introduce new system in hospital by skilled IT persons. It is also crucial at this stage to explain to employees the importance of organizational change and the need for them to contribute in it. The following stage is to implement the necessary adjustments and modifications by establishing the needs of IT trainings and maintaining a strong IT infrastructure within departments.it is mandatory to install sufficient numbers of computers including accessories in departments for example if one ward is divided into 4 sub wards then every sub wards can have one computer which works efficiently that at the time of consultant round junior doctors or assigned staff can note their orders and present situation of the patient in their record. Finally, after the modification has been performed, the new practices are shifted to the established order after proper IT training to every employee, and the "Refreeze" phase is implemented to maintain the status quo (Lewis, 2016).

1.8 Human relations and behaviour theory

This notion is put into practice to meet the demands of the workforce. Managers are assumed to be human beings who can understand their employees needs and assist them become an advantage to the company.

The paper suggests and give idea of good management to promote improved government services and to promote the idea of good governance to growing countries like Pakistan to ensure that sensitive public data that has been digitised is not misused after the installation of an ERMS technology in a public sector organization, the idea of "digital information" was also proposed. The lack of a comprehensive records management system at Pakistan's Civil Hospital, which is one of the country's most important government institutions, calls into questions. As a result, the aspects of good governance such as accountability, transparency, and efficiency cannot be realized without the deployment of ERMS and its application. The report also identifies whether the chosen organization is ready to adapt ERMS and identifies possible opposition. To overcome this opposition, various change management theories are being developed. Interviews with those in government entities responsible for the record-keeping system are done for this aim.

Information technology policies in Pakistan

In the past, experts have determined that regulation is a significant component in the implementation of ERMS (Avgerou, 2010). Developing countries like Pakistan, for the most part, lack the policies and guidelines necessary to implement ERMS. Because of this, there are issues and hurdles. As a result, the country's Information technology department's policy on ERMS deployment should be one of the most important factors. To ensure that ERMS systems in government organizations benefit the general public and assist the government in formalizing the ideology of good governance while providing services to the citizens of the state, an IT policy that takes into consideration all of the important issues related to integrity, governance, and trustworthiness of the systems must be formulated and later implemented.

The adoption of an electronic record management system (ERMS) in an organization unquestionably involves a significant shift in organizational culture, responsibilities, rules, and operational procedures. The ability of an organization to manage change is a vital element in the development of establishing new policies and procedures (Gunnlaugsdottir, 2009). There are many different ideas and theories that deal with the subject of change management, but the essence of each is the same. People who are experiencing true emotions, anxieties, and hopes are involved in

the process of change. To successfully make a change, it is first necessary to recognize that the employees who will be affected by the change will interpret the adjustment in perspective from their own personal experiences and perspectives. As a result, adapting to new changes, significantly in relation of technology in their field, is incredibly challenging for them. To guarantee a successful deployment of ERMS in diverse departments and agencies, management must ensure that all of these challenges are addressed.

To manage the change brought about by the deployment of ERMS in an agency such as the public service, it is necessary to realize that everyone in society reacts to change differently, according to (Adam 2008, Alshibly 2016).The second most crucial skill is political competence; change managers must have a thorough understanding of the company's culture in order to use it effectively. Aside from it, the project leader must have analytical skills in order to accurately identify and analyse the scenario. System knowledge is also required so that the administrator is aware of the functions and applications of the new ERMs. Finally, they must demonstrate Business Skills, which require the manager to be knowledgeable about the company's business and operations (Collins, 2008).

Civil hospital, a state agency in Pakistan, is the study conducted for this thesis. In this scenario, information will be gathered from various levels of the department and wards in order to assess the existing state of record-keeping and services offered. Interviews with senior leadership and staff were done to acquire vent data, while a questionnaire was employed to gather information from junior doctors and nursing staff at Civil Hospital and its wards.

The goal is to look at how an electronic management software can help the state provide better services to its citizens while also helping the organization's personnel operate more efficiently. The present procedures for obtaining a fresh appointment as a consultant are the primary focus of this thesis. The secondary issue, on the other hand, contains appointments for treatments such as ECHO and major procedures such as coronary artery bypass grafting; these are the procedures that the general population had to go through every month.

The processes necessitate interaction with the Civil Hospital's system and personnel. These are some of the department's key services, and they necessitate a lot of effort from personnel, as the sheet system and haphazard digitised system slow down the process, causing unnecessary delays and irritation to the public. As a result, Civil Hospital is unable to provide good service from its

end. The study will go over the challenges at hand, the existing condition of solutions, and the most efficient way to enrol ERMS and boost the efficiency of the organization.

2 RESEARCH METHODOLOGY

The author chose to perform Mixed method analysis of data were for this study. As said mixing quantitative and qualitative approach leads to better understanding of phenomenon and events then approaching alone (Creswell & Plano Clark, 2007). When these two types of data are combined, the researcher gain both the detailed, scrutinized insights of qualitative data, and the apparent, externally validated insights of quantitative data. As to compensate for their mutual and overlapping weaknesses, qualitative and quantitative methods should be combined (kelle. U 2006). Data was collected from fourteen semi structured interviews of top management and consultant doctors, and an online survey was done from junior doctors and nursing staff. 32 peoples participated in this survey. The flexibility of mixed method research has enhanced its utility for integrating or intersecting with other research approaches (Plano Clark & Ivankova 2016). The author chose the method because wanted to understand the situations while living in another country.

Research design and approach,

Research Design refers to the overall approach or structure of executing or planning a research project (Edelson 2002). There are many approaches to ensure that research questions are formulated operationally or rigorously. The mixed research method will be conducted for this study because it allows the researcher to analyse thoughts and attitudes while also investigating cultural and social events. In mixed research method with other approaches, new insights can be gained for both improving theory development and testing, as well as improving organizational decision-making (Wahl & Durst, 2022). Action research, case study research, and grounded theory are examples of research approaches. In the operational conduct of research, to ensure that meaningful study results are acquired, it is possible to select a method that is most suited and appropriate for the research study. The case study approach is a method in which the focus of the study is on describing a phenomenon and exploring it. The main advantages of case study research include a high level of detailed analysis and the ability to combine both objective and subjective data to gain a comprehensive understanding of the topic (Tumele, 2015).

Data was obtained for this study in an atmosphere in which the researcher had little control over events and was based on true happenings. It is critical to first comprehend a problem before attempting to solve it. This thesis is about the status of electronic record-keeping in government agencies. As a result, it is critical to comprehend what an ERMS is and how critical it is to good

governance. It is then deployed to maximize the benefits of the information after gaining helpful insights from earlier data and reports (McCardle, 2004). Various methods were used to process the data, and then in this study, data from interviews with government officials was the major source of information of Civil Hospital. The interviews served to assess the e-readiness of the hospital, a local government in Pakistan. Although the interviews do not provide scientifically validated information, they prove to be the most efficient source of information for case study research to assess first-hand a description of the current situation in a department.

In addition, the study looks into Pakistan's network Infrastructure and body of law for ERMS adoption. It also analyses the present skills of ministry workers in order to assess the challenges that may occur as a result of the implementation of ERMS. It should be mentioned that there are just a few studies that go into detail into the adoption of ERMs or the current status of ERMs in Pakistan.

This study will be of assistance and will act as a foundation for future research on this subject. According to Kothari (2004), a study's population can be described as all units with specific features relevant to the researcher's inquiry (Kothari, 2004). This implies that the study's population is a group of persons chosen by the researcher to be included in the study. The civil hospital's senior staff. Physicians and para medical staff who work with patients, both senior and junior.

As previously stated, this section details the steps involved in conducting a study. This section discusses the tools and strategies used to answer a specific research topic.

Data collection

To collect data that is appropriate for the study and provide meaningful conclusions and discussion, two methods for collection of primary data were used i.e. semi structured Interviews and online surveys. The mixed method used to tackle a research objective has a significant impact on the research’s outcomes as according to (Saunders & Lewies 2009) mixing qualitative and quantitative methods is possible and may be highly appropriate within one study.

2.1 Interview

Using interviews to explore meaning construction and negotiation in a natural setting is extremely valuable (Coh 2007). It is necessary to employ methods of primary data collection that are effective, and one of the most effective is interviewing. Despite the limited historical coverage, qualitative interviews have nevertheless been able to advance and fundamentally develop important aspects (E. Aldhabi & Anozi 2017). For this study, the author chose to conduct interviews with open-ended questions as we believe this will allow respondents to freely express their opinions on the topic of the study. Manual for interviews was taken from thesis work of Taltech student as it was most related to my research topic and then questions were edited accordingly.

The data is collected through fourteen semi structured interviews with different parties including the Medical Superintendent of the Hospital. They were chosen for their competence and experience inside the organization. The significance of using ERMS and the likely effects of its adoption in a developing country like Pakistan were questioned of the responders.

2.2 Survey

People from the hospital and its departments, such as medicine and surgery, were requested to complete questionnaires in order to gain a better understanding of the existing state of services, their efficiency, and the department's available infrastructure as Qualitative data can be contextualized with survey data (D Silverman, A Marv Asti - 2008). The information gathered utilized as secondary data to back up the conclusions of the literature review and interviews. A random sample of thirty-two Civil Hospital employees were requested to answer questionnaires that contained questions about the current state of things and staff readiness to deploy an appropriate ERMS infrastructure in the wards.

2.3 Data analysis

The data analysis process is one of the most crucial aspects of any research. Analysis of data has more negative associations in qualitative studies than any other aspect of the study design. Because information is recorded in the form of thoughts and opinions rather than statistics and figures in a qualitative study, this is the case. This is the process that distinguishes qualitative research from

quantitative research. In this research, the author chose mixed methods of analysis. The data gathered by interviews were analysed through Thematic analysis with the help of RQDA software. The data gathered by surveys analysed through SPSS and the Descriptive analysis method of non numerical data to support the results of thematic analysis.

Thematic analysis is a method for analysing, organizing, describing, and reporting themes within data sets (Braun & Clarke, 2006). One of the most often utilized qualitative research methods is thematic analysis. Thematic analysis is simple to use and thus the best method for educational researchers unusual with more complicated qualitative analytical techniques. Choosing a theoretical framework is possible with this method. The open-source qualitative data analysis software (RQDA) is used to analyse the data for this study. Thematic analysis of these interviews includes defined categories and codes that assist analyse often complex interview questions.

Familiarisation

The preliminary stage for different codes that define the data of the interview are established in the first stage involves familiarisation with the data gathered, initial concepts for interview content codes are established. The conversations must be reviewed and evaluated repeatedly. First impressions are noted, as well as repetitions that are appropriate for the study. It is critical that the researcher captivates himself in the documentation and becomes acquainted with it. If the information is provided orally, it will be transposed before being read and reread. Before relocating onto next step, which involves coding and finding a meaningful pattern, it's critical to go over all of the data. The objective is to start taking notes.

Initial Codes

Multiple codes are allotted to the gathered and transposed data in the second phase. The code makes it easier to describe what was said during the interview. This is where the initial codes are created from the collected data.

Coding can be done by two ways either manually or with the help of software. But since as many possible future codes as possible are required at this stage, coding should be completed as methodically as possible. After the data has been coded, the data from the same code is decided to merge. During the interview, every time something relating is heard, it is coded. A code is a summary of an idea in the question-and-answer session that aids in organizing it. It is not an

interpretation. It is critical to organize the information in a way that is both logical and useful for research.

Themes

Identifying themes for the codes will be the next step. Rather than being restricted to data interpretation, the themes are broader in nature. Creating a broader level for themes is the idea. All the codes are categorized and grouped into relevant groups. This was accomplished by creating a mind map of the various codes that was based on their subsets. As a result of the codes, the main themes and the subthemes were formed. By now, we should have a collection of themes and subthemes.

Review

After that, the themes are checked to see if they are applicable to the research and significant to the research. The meaning of relevant themes is finished in this section, and the codes are therefore formalized under the defined themes. In this case, some themes are combined with others, while others are broken down into components. "Review at the point of coded data" and "review at the stage of themes" are the two stages of this process.

Establishing the themes

This step is crucial because it aids in highlighting the significance from each theme and describing the different aspects of the information gathered. A full storyline of the information recorded is created in this case. The narrative of each theme is then analysed, and whether it appears to fit well into the overarching narrative of the study is determined. There are also sub-themes within the themes. After that, the themes will be given an official title, which are currently only working titles. The names should be brief so that the readers can understand the significance of the subject. We can now explain the information that is pertinent to the studies and will be discussed at this stage.

Reports

The final step is to write a report summarizing the findings and organizing the themes and codes. The analysis must be concise, coherent, and pertinent to the topic. The data collected should be sufficient to support the themes (Maguire, 2017).

2.3.1 RESULTS AND DISCUSSIONS

The goal of this chapter is to have an overview of the case in question. It contains information about the contents, facts, and characteristics. The study's background is first discussed in order to gain a better understanding of the subject at hand. The current procedures for providing various services at the Pakistani government department Civil Hospital are clarified. Information is provided to demonstrate how, in a country like Pakistan, the insufficient infrastructure in such agencies obstructs the concept of good governance. The previous chapter's data are analysed and discussed. The findings are also given a logical interpretation, and the literature review backs up the research question. The study validation procedures are also discussed in this chapter.

2.4 Results of thematic analysis

This section summarizes the findings of the data analysis conducted at the hierarchy and middle hierarchies of the government agency. To ensure that the analysis was accurate and effective, the six stages of thematic analysis (familiarization, production of codes, implementation of themes, evaluate of themes, description of themes, and generating reports were used. During the analysis, several codes were discovered among the collected interview sessions and transcripts. Such codes were then divided into groups based on their relationship. The table below lists the themes that will be used to conduct in-depth assessment and answer the questions of the study.

Thematic analysis is a method of recognizing, analysing, and portraying patterns in data, according to (Maguire, 2017). One of the most common methods for conducting qualitative research is thematic analysis. It is a technique that establishes the basic research analysis process and must be elaborated in order to position one's own in a quantifiable research paper. Because of thematic analysis’s flexibility, the researcher can select their own theoretical framework. The researcher can use thematic analysis with either of the theories he or she chooses. A thematic analysis' flexibility allows for a more thorough, rich, and complex analysis of quantitative evidence.

The following section presents the results and elaborates on them. These results are based on the themes made from interviews. The themes obtained from the transcripts’ codes help us draw logical conclusions from the data (Figure 3).

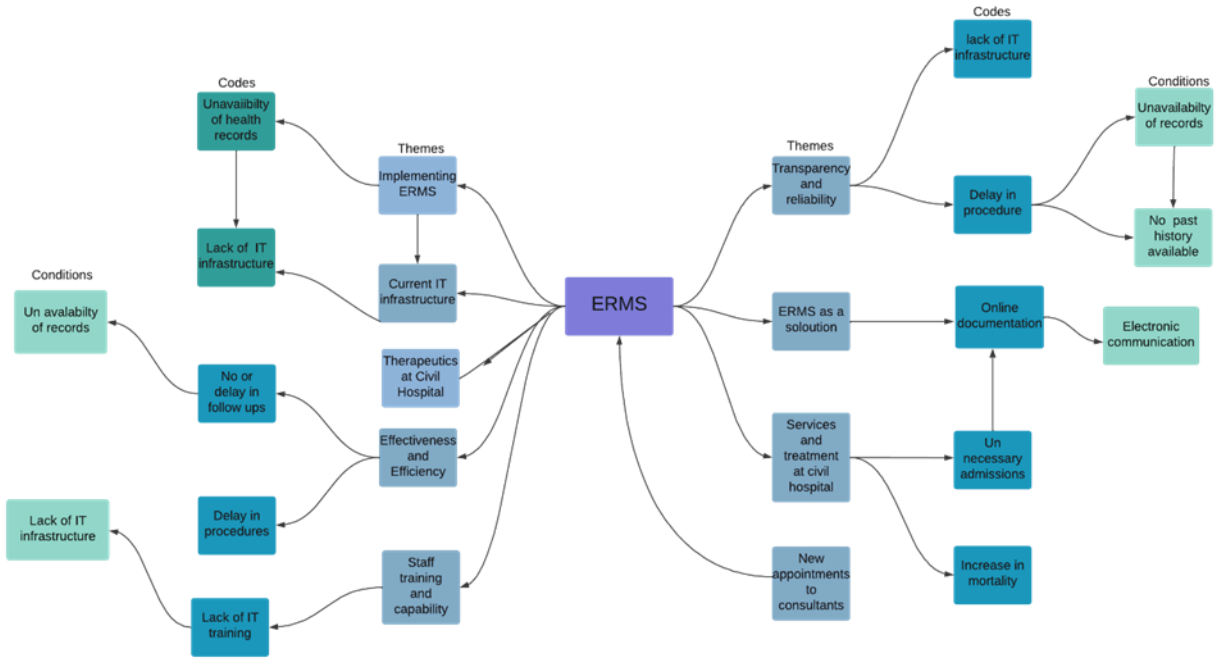


Figure 3. Mind map of themes and codes
Source: Author's depiction

Implementation of ERMS

As stated earlier in this study, ERMS systems are an essential component of any organization in order to ensure that it flows efficiently and needs to meet the state's dynamic record-keeping requirements. Currently, the paper system, which has been in use since before the independence, is still used to keep track of most processes and records. The current status quo in Civil Hospital or its government agencies is very far from ideal, according to the data gathered from the respondents. Therefore, it is imperative to change the processes and transform them into the themes automated systems. However, as evidenced by the literature review and confirmed by the data collected (as cited in literature review) numerous challenges need to be addressed to ensure that the implementation of ERMS at Civil Hospital is successful.

In Civil Hospital and its departments, there aren't many obstacles on the way to a computer-controlled maintenance of data and management system. The first and most important, according to the interviewees, is a lack of resources. According to one of interviewee government-funded departments lack the primary resources needed to carry out their daily tasks on proficient levels. Furthermore, there is a staffing shortage, indicating that the therapeutic approaches are superfluous and require a large population of persons. Also, when the necessary equipment is not readily available from the government, it becomes difficult to process requests for new admissions or

respond to patient complaints. Everything in this place is connected. The government must cut costs and create an efficient system which allows for automated service management.

There are also a number of issues with government employees. There are more than three decades of continuity among employees and have never been trained to upgrade their skills to meet current demands. They don't even know how to operate a computer, much less an ERMS. It will be critical to ensure that all these staff members are taken care of when implementing ERMS. According to the data gathered, ward and office staff training is limited to a basic understanding of basic software which are necessary for storage of data. In addition, they are taught how to communicate via smartphones and transmit pictures of the labs and X. rays or other Imaging. This is indeed a worrying state of affairs where undoubtedly not even the senior Doctors are aware of the efficient recording methods to ensure that the examinations s are completed on time.

Another issue discovered during data gathering and personal interview with Civil Hospital's upper executives was power and authority abuse as one of our interviewee said that they are not consider to take decisions alone. The way power is shared through the hierarchical order is among the most severe effects of state apparatus seen in most government institutions. The implementation of a proper ERMS system would then put this control and responsibility, which has been wielded for decades, to the test. Executives and top management (Medical Superintendents and their staff) do not give up their executive power over employees voluntarily. Technology-driven reforms are unlikely to change the power structure.

The misuse of resources was discovered as a very concerning issue to ERMS implementation after evaluating the data collected. Unfortunately, residents of the state are also uninformed of their civic duties. Even online portals are used to file bogus claims and cause problems for an organization that already lacks personnel and resources. As a result, it's critical to set up a system to check for false complaints so that these people's IPs or accounts are blocked, and they're held responsible for the harm they've caused. This is also only possible if the government ensures that a speed ERMS system is properly approved in the ordered for processes like submitting and dealing with complaints, providing Treatment services, and processing new appointment and follow-up applications.

Structure of the information technology

In the first stage of the research paper, the current IT framework in organisations was discussed. According to the literature review, IT infrastructure in government organizations is critical for the

implementation of the ERMS system, our country does not help in provision the required IT framework or trainings to important government agencies, such as CIVIL Hospital. These statements are correct, but they have not been tested, so they remain just that: a proclamation, not a fact. This theme emerges from respondents' responses and survey responses, proving this same contention's validity while also raising serious concerns about Civil Hospital's current IT infrastructure. The analysis' results supported the imperative need to introduce an ERMS (Electronic Record Management System) to improve the existing state of a major organization such as a civil hospital and its wards. All people interviewed and survey respondents highlighted the importance of establishing an automated record-keeping and management system. Due to a lack of IT infrastructure and the need for proper training, both government workers and citizens of the country are currently experiencing significant inconvenience and problems. The respondents were all in charge of major wards' top management. Their comments show that they have no idea what a records management system is or how it aids in the smooth running of processes.

There is no doubt that ensuring proper IT policy and infrastructure is of paramount importance. Obviously, the most significant thing is to ensure proper IT policy and infrastructure. In addition, understand the concept of digitally created data, and take the time and effort to manage it effectively. it. Furthermore, governments must recognize that they must provide the necessary tools to promote transparency and accountability in order to achieve the fundamentals of good governance, which are currently lacking.

Every government should have the duty to work toward systems that allow it to govern in a positive way for the community at large. However, as previously mentioned, in Pakistan, there is a lack of awareness and proposals that other countries like Estonia have found vital for health record management. These critical factors have contributed to developed countries having an ideal model that provides better health care to the public.

Therapeutics at civil hospital

One of the primary reasons for implementing an ERMS system in any organization is to ensure that the therapeutics provided are conducted out as efficiently as possible. As a result, we need to comprehend how an ERMS system can assist us in doing so, and to do so, the current flow of practices should be studied, identifying redundant iterations throughout the entire procedure. During data collection, one of our interviewees said that therapeutics and services are getting decline day by day

New appointments to consultants

Two ways are available for requesting a new appointment with a consultant as per the respondents' responses. A portal can either be used or an online application can be used, Additionally, patient or attendant can ask the Hospital Receptionist to check for spots at the reception. Even after a phone call for an appointment is submitted, the rest of the process is done while visiting by an attendant of the patient, with most of the communication between staffs of different departments done through WhatsApp messages or phone calls. Each Consultant and his team have its email addresses, but it is hardly used because not all staff can communicate via email.

Complaint and patient's follow-ups

If a patient feels unwell even after treatment, can get advice only upon arrival to Emergency. These complaints even from ER travel from the nurses, and to the consultants through junior doctors on OPD days, where there is no proper system followed, only after going through some channels which are redundant and completely unnecessary. Clearly, the current processes are inefficient and unreliable, resulting in a great deal of inconvenience for the most important patients.

Effectiveness and efficiency

There is no uniform system to carry out the different treatments and to respond to the patients' or carers' complaints as said by one of interviewee. He also explained how the different processes are carried out, e.g. appointment requests for new appointments and follow up appointments. The hospitals still keep manual registers to record therapeutic complaints they receive by phone or by visiting ER. Patients do not have an organized system for tracking their complaints. The reputation of state hospitals has suffered dramatically as a result, and the department has a negative image that it has been unable to change despite working long hours.

Rather than just working hard, it is imperative here to work intelligently. A method that saves them from having to keep large registers and manually track down the number of a complaint to provide follow-up information to the parties involved. The hospital needs a system that will allow the clerks and the other staff to handle complaints and queries efficiently and admit only eligible patients to the hospital. The efficiency and effectiveness of the current operations discussed by interview participants clears the idea of improving the efficiency of the department's various services by introducing ERMs.

Employee training and skills

The information obtained during the interview sessions show that so many employees in government entities, such as the Civil Hospital, simply lack skills to adopt the modification that the deployment of an ERMS system will bring. They will face a lot of opposition if they disapprove with the implementation of the system. Nurses are currently incapable of operating computer. The majority of patient histories and prognoses are still recorded manually on paper. These complaints are then manually forwarded to be resolved. As a result, there is an immediate requirement of training programs that provide existing employees with a proper knowledge of an ERMS system and how to use it. Thus, the discussion points that current employees lack training and skills were confirmed by the data collected from the respondents. In this sense, training programs can help organisations manage and adopt a change more effectively and with less resistance.

Transparency and reliability

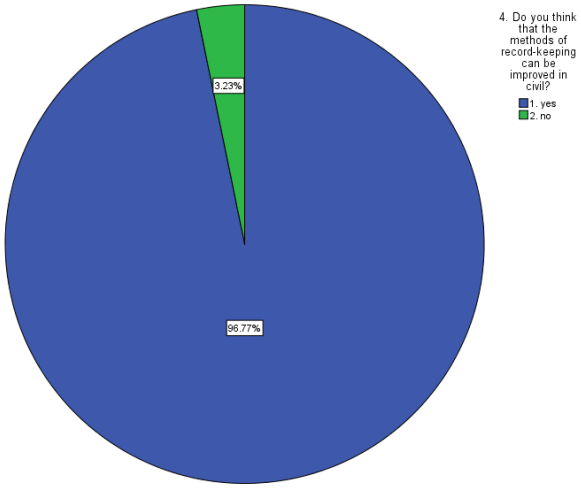
Based on previous discussion and analysis, it is evident that the majority of therapeutics provided by Civil Hospital Karachi are inefficient and frequently repetitive. There is no follow-up on treated group unless the patient returns to the emergency department with fresh or similar complaints. Transparency is impossible in such a system. It is difficult for ordinary citizens to rely on the system; they are frustrated when their complaints or requests are not responded to and they cannot be scheduled for an appointment because there is a long wait. Without transparency of data and reliability of processes, the government is unable to deliver good quality services.

2.5 Results of the survey

An online designed survey was conducted among the staff of the civil hospital. It was decided that 50 surveys will be conducted but unfortunately because fewer peoples were motivated and got time to fill the survey forms, hence 32 results were obtained. Almost all the staff was agreed that technology is a vital part of our daily life hence the introduction of ERMS in hospitals will create a lot of positive change in the overall progress of the hospital, claimed that through the implementation of ERMS, there will be transparency of and is essential to increase efficiency,
While talking about the main issues comes during daily workflow of patients in civil hospital the most frequent answer was lack of skilled staff (Table 1, Appendices), lack of digital infrastructure with frequency of 15, while second most voted answers with frequency of 5 out of 31 were Communication inefficiency, Bureaucracy and hierarchy, Bureaucracy, and hierarchy Structure. While other set of responses were mixed each with frequency of 1 out of 31.

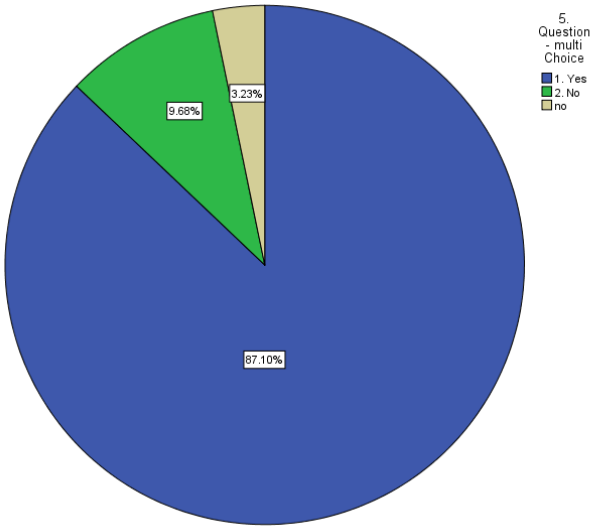
The responses to why the patient care and their treatments have deteriorated at Civil Hospital were mixed. However, most of the respondents agreed that the lack of infrastructure and the power play due to the bureaucracy and hierarchy structure was to blame.

While most of the responses claimed that through the implementation of ERMS, there will be transparency of and is essential to increase efficiency, many believed that it is an expensive process and that unskilled Staff in terms of IT might lose their jobs in the organization.



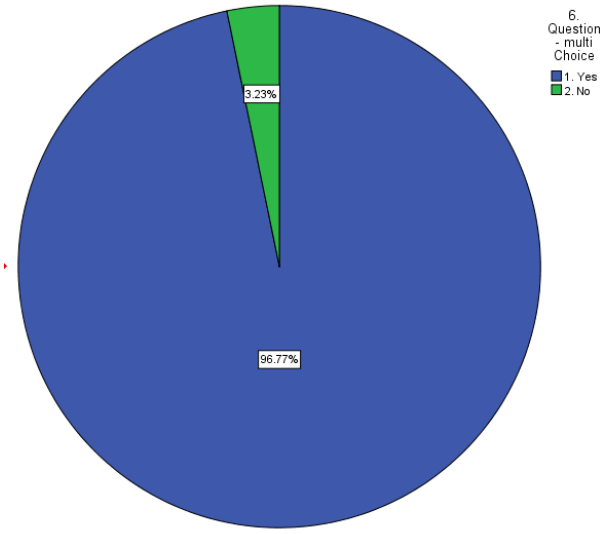
Fig#1. Do you think that the methods of record-keeping improved in local Civil hospital?

31 out of 32 recorded that method of record keeping can be definitely improved while 1 of them was unsure about it.



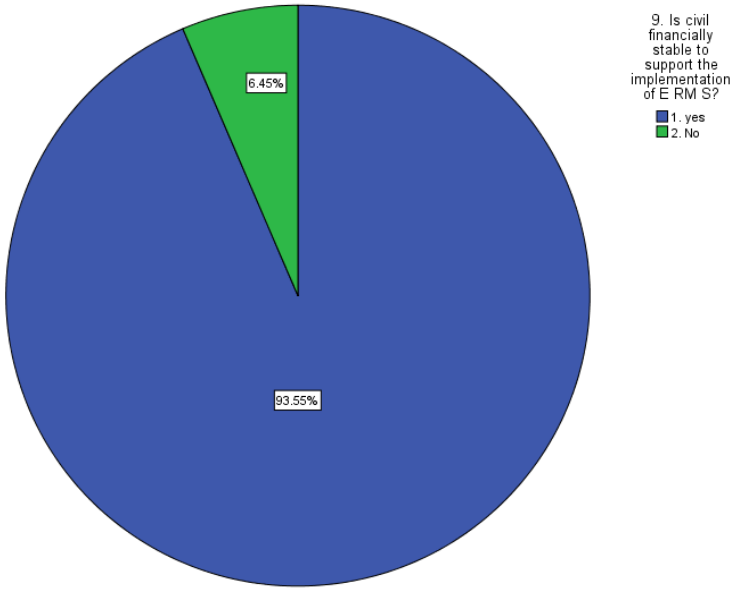
Fig#2: Do you think Civil employees will show resistance to change?

Four respondents out of thirty two were not sure one replied no and rest of them replied yes Most of the responses shows that there will be no resistance to change hence it is obvious that staff is positive towards the implementation to change.



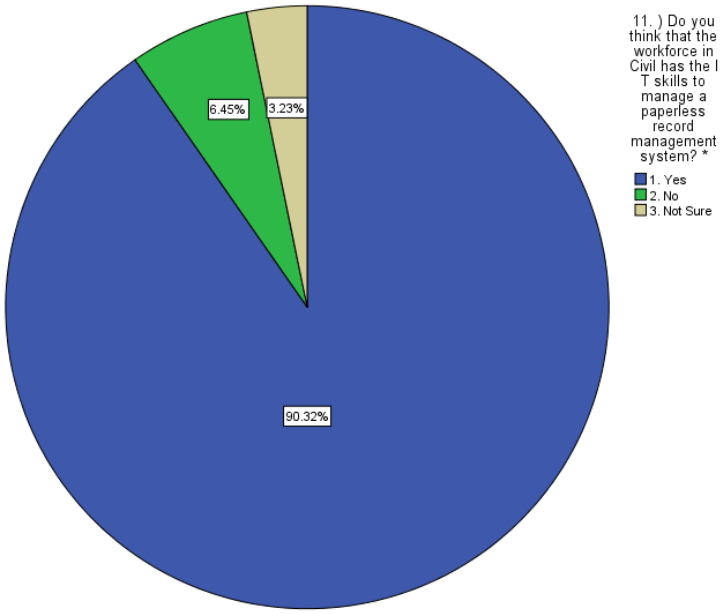
Fig# 3: Do you think government should support the enrolment of ERMS in all other health sectors?

31 out of 3 peoples replied that govt should support ERMS while only one was not in favour



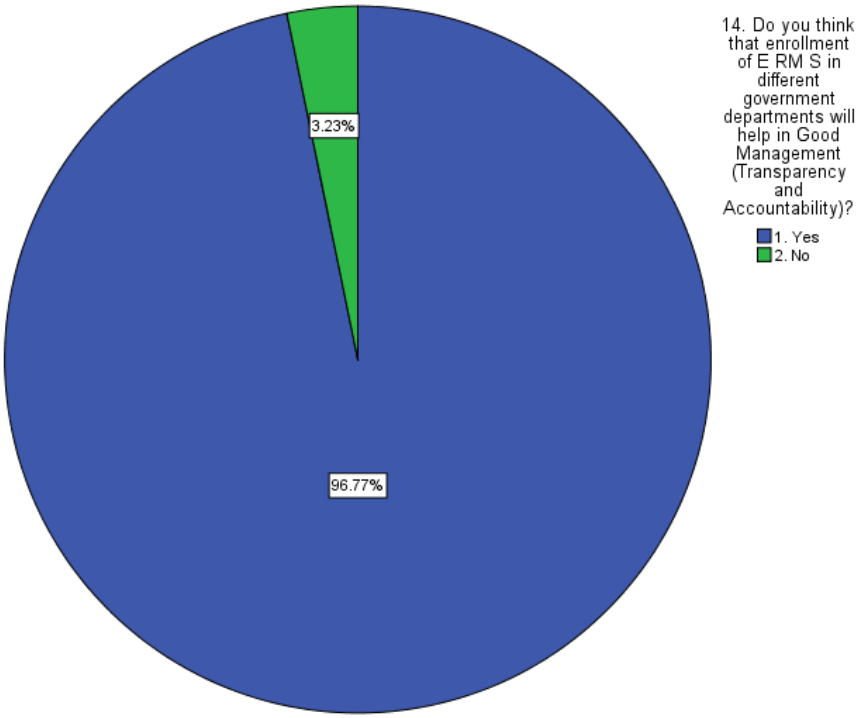
Fig# 4 is civil financially hospital able to support the implementation of ERMS?

Only one out of thirty-two of employees have an idea that Civil Hospital Karachi is financially stable to implement ERMS instead of paper or CD records.



Fig# 6: do you think that workforce in hospital has the IT skills to manage a paperless record system?

29 out of thirty-two employee answered that they are capable of learning while one of them are not willing to learn and two are not sure about their skills.



Fig# 7: Do you think that enrolment of ERMS in different departments of Government will help in good management?

Total 26 out of 31 peoples replied that training of staff. Provision of IT infrastructure and maintenance of good budget can help greatly while adopting ERMS, 2% said about steps of government towards training of it staff along introduction and then training under IT staff supervision. (Table is shown in appendix).

In conclusion, it can be said that the results gathered from the survey conducted concede with the ideas discussed in the thematic analysis in the previous section.

Most of the respondents conceded on the idea that the implementation of an ERMS system will be a useful step towards the improvement of therapeutics and good services provided by hospital. There were different responses received when asked about the necessary steps to make sure that the ERMS implementation is effective, which included staff training, provision of IT infrastructure. Almost all of the employee agreed that technology is an essential part of our daily life and CHK has enough

financial resources to implement ERMS, but it needs government's support as well. Only one of the respondents think that there will be resistance against change management but rest of them are agreed with positivity.

3.3 Recommendations

The study's theory, as described in the preceding sections, is that implementation in an ERMS in public bodies is critical in order to ensure efficient processes that facilitate good management and governance, while also analysing potential challenges and finding solutions along the way. An examination of the existing processes revealed inefficiencies, and inefficient practices within the system. In alignment with the ideas discussed in the study, the chapter will include recommendations in order to guide ERMS implementation. The following section will include recommendations according to the research questions found out during the data gathering process and analysis.

RQ1: Can government hospitals effectively implement Electronic Record Management System (ERMS)

According to the findings, it is critical to ensure that the measure the e-readiness of an organization when enrolling Electronic Management System (ERMS) in a public body such as Civil Hospital. After reviewing processes and record-keeping practices in civil hospitals, the organization is not yet prepared to adapt to the significant shift that an ERMS can bring. As results of survey question number two shows that 22 out of 32 employees opted the reason of this as lack of IT infrastructure, skilled staffing and Bureaucracy and hierarchy Structure which influences badly on over all progress of the organization. Province's government should pay attention towards a update in hospital's IT architecture, trying to introduce up-to-date systems and networks capable of supporting ERMS, in order to implement a successful ERMS implementation policy. Furthermore, management must be trained ahead of time to ensure that they are prepared to deal with different situations that an ERMS system will bring to the organization. The organization should then develop training programs to provide the necessary skills to the employees. The training programs should be comprehensive, catering to all levels of training currently held by the employees. From the medical superintendent to consultants and junior doctors, training sessions should developed accordingly. It's also crucial to create IT policies because any new system should come with instructions on how to use it properly and efficiently. Implementing an ERMS system can be a lengthy and time-consuming process, but it is essential for any organization's development and

growth currently. Training is an essential part of the ERMS system's effective implementation, and if there is too much time between implementation and training, the staff will not be able to retain the skills learned. As a result, the level of training required is proportional to the level of engagement with the ERMs system. For example, the Manager must be trained, and they must also know how to assist their team members in training the information technology staff. The computer technology staff, on the other hand, must be able to integrate the software into current technology, as well as manage the software and hardware. Similarly, record managers will require training to perform both technical and administrative duties. It is also critical to ensure that users who have received training on how to create records and search for information while adhering to the system's requirements.

RQ2: How can the Civil Hospital Karachi overcome the barriers to implementing Electronic Record Management System (ERMS)?

As it is obvious that it is vital to first identify the challenges in order to resolve them. It is exciting to conclude from the analysis and data gathered by interviews and surveys that the Hospital staff are able to adapt to a more efficient system that will assist them in providing efficient services as 31 out of 32 respondents are positive towards the implementation of ERMS, hence it is proved that staff can play a positive role in change management. As a result, it can be said that in order to overcome the difficulties to ERMS adoption, the government must first develop uniform necessary policies and provide the necessary financial support. The Hospital's management and top-level management must adapt to the change once it has been implemented. To analyse the current scenario and establish the right plan of action, a proper and competent team should be formed with skilled persons who can resolve the problems coming in the way.

RQ3: How an electronic record management system can increase the efficiency of the daily workflow?

To clear this up, it's first necessary to examine the method by which services are delivered at the hospital daily. Based on the results of interviews and surveys, 31 out of 32 respondents are willing to adopt the change as they think that ERMS can be a definite solution to the continuous deterioration of therapeutics and services at CHK. It appears from the results of interviews that a disorderly blended system is currently being used. For example, when a new patient arrives, a lot of time is wasted waiting for unnecessary registration details if ERMS is implemented then it is

easier for concern staff to create new appointment or follow up immediately. The effectiveness of the daily work routine can be greatly improved if proper communication systems are implemented. The requisite documents and information will be delivered to the forms in a timely manner. The identification can be verified by entering NIC numbers or medical record numbers in the database in case of a previous admission, and the old history can be updated on the system and relevant data of patient's diagnosis, treatment, response of patient during hospital admission or home treatment and prognosis can be seen upon in need.

RQ4: How can we overcome resistance to change at the Civil Hospital Karachi during and after the adoption of the Electronic Record Management System (ERMS)?

The data gathered by interviews and surveys shows that most current employees lack the necessary abilities to adapt to the new procedures introduced by ERMS. This is a common source of resistance, and to solve it, a staff training program should be implemented prior to the implementation of ERMS to teach them basic IT skills. Furthermore, it is critical to have the staff onboard and participate in the change to ensure that they are satisfied with it. For instance, their comments on the issues they face can be collected on a regular basis on a feedback form. Furthermore, top-level management can make the first move to connect with employees, address any concerns and issues, and then resolve them. An organization must establish an infrastructural development to ensure the successful implementation of electronic record management programs. The infrastructure facilitates the construction of guidelines required for record and information management. It has been observed that an effective policy is the result of a comprehensive assessment of the organization in question. In an ideal world, the policy would be developed after surveys, business cases, and project plans had been established. However, in this particular instance, the Sindh IT Department has already developed specific policies that can be used as a road map and modified to meet the needs of the Civil Hospital. Any record policy should include the following provisions:

1) The types of records and how they should be managed will be defined in a guide.

2) An explanation of how the implementation of records management will enhance efficiency.

3) The development of policies that are tailored to the specifics of the organization and are in accordance with each aspect, which will form the basis of its implementation.

4) An organization's record-keeping must rely on any necessary legal basis.

Conclusion

It is apparent from the study's findings that adopting good governance requires first introducing technological reforms in public sector organizations such as the Civil Hospital in Pakistan. Currently, the IT infrastructure in the country is not robust enough, and it requires enhancement and the attention of relevant authorities. The implementation of an ERMS will remain successful and serve the intended purpose only if many challenges are overcome as it is shown by the answers during interviews. Transparency will be promoted by implementing ERMS and better managing public information, where patients can be held accountable for resource mismanagement and government employees can be held responsible if there will be no provision of good therapeutics and services. A system should be implemented which will ensure that officials involved in corrupt practices are held accountable and disciplined.

Furthermore, it should be the obligation to government and higher leadership to support programs that train current managerial and medical staff and equip them with the skills necessary to use the ERMS system. The medical personnel, as well as the nurses. All of these employees should be given a basic understanding of the software as well as expertise in using the innovation taken to achieve the tasks assigned to them.

In conclusion, policies and guidelines are required to monitor digitalized systems. Finally, it is critical to have some guidelines and policies in place to monitor digitalized systems. These policies should be updated on a regular basis based on regular reviews on the performance of the deployed reforms and systems. This is performed to verify that the ERMS system is functioning properly. The enrolment of ERMS, as well as its maintenance and the necessary IT infrastructure, necessitated significant financial and moral support from the government. The need here is to ensure that these resources are not squandered and that the change brought about by ERMS is optimistic and welcomed by public entities such as a hospital.

This conclusion have been prepared to help with the achievement of the study's goal. Following the previous chapters and the evaluation findings of the research, several factors and approaches are explored in the previous chapter. It proposes a suitable and sustainable approach for a long-term increase in operational efficiency, community participation of transparency and accountability.

Offices in any government agency or department require critical financial support and acceptance to formulate and maintain a program. To obtain approval and funding, senior management must understand the importance of such programs. As a consequence, the record consultants must develop a solid business case for the initiative. The business case must be able to persuade the reader of the importance of enrolling in an ERMS system. For instance, in order to enrol in the ERMS system, a record supervisor should discuss the recent requirements for keeping records as well as the benefits of switching to an electronic system. The following information is suggested for the business case.

The service levels and processes should provide a thorough discussion of whether or not the system can currently start serving the organisational needs. A risk-benefit assessment should be undertaken. The goal of this research is to outline the benefits and drawbacks of the new network being introduced. A proposition for the layout of the ERMS system, along with all requirements such as technical experts and all required software and hardware. The number of individuals who will be related to the implementation. A list of all the changing facilities, including all of the necessary equipment. A draft for carrying out the project strategy and the methodologies for dealing with the challenges that arise as a result of the change. Recommendations for dealing with change. A sustainability report examines the record manager's proposed changes and their impact on the hospital's budget.

As evidenced by data from interviews, it is clear that there are scarce resources at Civil Hospital, and many issues remain unresolved as a result. Bottom-line costs must be built to make the decision-making operation more approachable, supported by the project's viability and the economies involved. The following are some of the expenses that must be estimated on general basis:

1) Purchasing costs;

2) Project support costs, including management and consulting fees;

3) Hardware and installation costs may include upgrading of hard- and soft-wares, back ups, index servers, etc.

4) ERMS system, email interface, backup, and operating system are part of costs associated with acquiring required software;

5) In addition to IT staff and consulting, technical support costs include;

6) Salary costs for staff that will provide trainings;

7) The license and maintenance costs are included in the running and operating costs;

8) Migration costs include the cost of converting paper data to electronic data as well as the cost of repairing corrupted or lost data.

The study investigates the theories and ideas surrounding the concept of Good Management, as well as the role that the application of an ERMS system can serve to facilitate the concept of oversight and accountability in various government systems and procedures. The top management of a government hospital was consulted for their expertise and opinions. It incorporated expert knowledge. In comparison, the survey questions collected from Civil Hospital employees drew on collective knowledge and crowd sage advice.

For the successful implementation of ERMS, several factors must be considered. Without professional expertise, it is impossible to develop an alternative that is both effective and executable given the country's limited resources. According to Blythe, the government of Pakistan has passed a number of ordinances to encourage and aid the use of technologies and digital communications in particular. Nonetheless, despite the basic framework and actual policies, Pakistan's record-keeping remains paper based. This also shows how frequently policies remain on paper rather than being applied or translated into existence.

Public sector organizations exist to manage taxpayer funds and provide services that benefit the public. However, as a result of a thorough investigation, it is clear that these resources could be better managed. The research aids in understanding the issues that exist because of outdated systems, as well as the measures that can be taken to update these structures for the benefit of society and the incorporation of the Good Governance concept.

Considering the foregoing, it can be concluded that the lack of an ERMS system in government organizations leads to inefficiency and delays in processes that require immediate attention and resolution. As a result, this is only logical to construct on ideas and plans that demonstrate an ERMS system in public sector organizations to combat inefficiency, which is often treated casually and leads to a slew of societal issues in a developing country like Pakistan.

Related limitations

This study is limited to a single case study approach that has received a lot of criticism from other researchers. The limitation stems from the research methodology's limitations. The first flaw is that data is collected from a single source, rather than from multiple sources, and there is a lack of methodological rigor. For this study, data was gathered through a variety of methods, including interviews conducted, documentary analysis, and online surveys. All of this can be contended, with the author being exonerated due to a lack of scientific quality.

The document reviews also relied on limited data on ERMS implementation. Little study has been undertaken in this vicinity, indicating disinterest. Every government department lacks professionalism, making expert interviews difficult. Invariably, promises were broken, and questions were conveniently avoided. Thus, the author's location hampered data collection from multiple sources.

At last, the issue of comprehensiveness is present. The research and findings from a single case study may not apply to the multiverse or entire population. Theories can exist without generalizing findings and results.

Aim for the future

This study revealed some areas that require more attention and research. For example, understanding why regulations on document are not applied and why ERMS systems are not implemented despite policy frameworks is critical. Further research can help resolve these issues. Future research can therefore include the following ideas. This thesis seeks to understand how to effectively enrol an ERMS framework in government bodies to reduce inefficiency and delays. A related research area will be developing a roadmap for evaluating and implementing ERMS.

Next, judicial components must be used to guarantee that these mechanisms are updated regularly and that staff members use them. Future research should focus on the obstacles that prevent staff members from using reformed systems. Ultimately, the information recorded shows that there is no set timeframe for resolving conflicts within government departments. With limited resources, it should be possible to address complaints or requests within an agreed-upon structure.

In addition to assessing government readiness, the general public should be prepared to use digital platforms, which can be achieved by maintaining appropriate IT curriculum in state education.

A further research area is the e-readiness of a developing country's population. The fact that the overwhelming majority of the country's population lacks basic computer skills is worrisome; apprenticeships such as night school for residents and seminars can be tried to introduce to address the issue.

LIST OF REFERENCES

Aziz, S., & Rao, M. H. (2002). Existing record keeping system in government teaching hospitals of Karachi. *Journal-Pakistan Medical Association*, *52*(4), 163-173.

Adhabi, E., & Anozie, C. B. (2017). Literature review for the type of interview in qualitative research. *International Journal of Education*, *9*(3), 86-97.

Adam, A. (2008). Implementing electronic document and record management systems (1st ed.). Boca Raton, FL: Auerbach Publications

Alshibly, H., Chiong, R. and Bao, Y., 2016. Investigating the critical success factors for implementing electronic document management systems in governments: evidence from Jordan. Information Systems Management, 33(4), pp.287-301.

Braun, V., Clarke, V. (2006). Using thematic analysis in psychology. Qualitative Research in Psychology, 3, 77–101. doi:10.1191/1478088706qp063oa

Akotia, P., 2000. Management of public sector financial records in Ghana: Implications for good government. African Journal of Library, Archives and Information Science, 10(2), pp.153-166.

Ali, A.M. and Yusof, H., 2011. Quality in qualitative studies: The case of validity, reliability and generalizability. Issues in Social and Environmental Accounting, 5(1), pp.25-64.

Anjam, M. and Siddiqui, K., 2013. WAPDA-HUBCO Dispute: Corporate Governance Failure. IUP Journal of Corporate Governance, 12(4).

Ashcroft, L. and Watts, C., 2005. ICT skills for information professionals in developing countries: Perspectives from a study of the electronic information environment in Nigeria. IFLA journal, 31(1), pp.6-12..com

Saunders, M., Lewis, P., & Thornhill, A. (2003). Research methods for business students. *Essex: Prentice Hall: Financial Times*.

Avgerou, C., 2010. Discourses on ICT and development. Information technologies and international development, 6(3), pp.1-18.

Tumele, S., 2015. Case study research. International Journal of Sales, Retailing & Marketing, 4(9), pp.68-78.

Blythe, S.E., 2006. Pakistan goes digital: The electronic transactions ordinance as a facilitator growth for e-commerce. J. Islamic St. Prac. Int'l L., 2, p.5.

Bokhari, H. and Khan, M., 2012, October. Digitisation of electoral rolls: Analysis of a multi-agency e-government project in Pakistan. In Proceedings of the 6th International Conference on Theory and Practice of Electronic Governance (pp. 158-165).

Collins, M., 2008. Electronic resource management systems (ERMS) review. Serials Review, 34(4), pp.267-299.

Cruzes, D.S. and Dyba, T., 2011, September. Recommended steps for thematic synthesis in software engineering. In 2011 international symposium on empirical software engineering and measurement (pp. 275-284). IEEE.

Cunningham, A., 2008. Going global: Developing globally harmonised software specifications for records. Archives & Social Studies: A Journal of Interdisciplinary Research, 2(2), pp.349-362.

Edelson, D.C., 2002. Design research: What we learn when we engage in design. The Journal of the Learning sciences, 11(1), pp.105-121.

Estrada, S., 2017. Qualitative Analysis Using R: A Free Analytic Tool. Qualitative Report, 22(4).

Ferro, E., Helbig, N.C. and Gil-Garcia, J.R., 2011. The role of IT literacy in defining digital divide policy needs. Government Information Quarterly, 28(1), pp.3-10.

Gibbert, M., Ruigrok, W. and Wicki, B., 2008. What passes as a rigorous case study?. Strategic management journal, 29(13), pp.1465-1474.

Šuc, J., Prokosch, H. U., & Ganslandt, T. (2009). Applicability of Lewin s change management model in a hospital setting. *Methods of information in medicine*, *48*(05), 419-428.

Golafshani, N., 2003. Understanding reliability and validity in qualitative research. The qualitative report, 8(4), pp.597-607.

Graham, J., Plumptre, T.W. and Amos, B., 2003. Principles for good governance in the 21st century.

Grindle, M.S., 2004. Good enough governance: poverty reduction and reform in developing countries. Governance, 17(4), pp.525-548.

Cho, V. (2010). A study on the impact of organisational learning to the effective.comess of electronic document management systems. International Journal of Technology Management, 50(2), 182-207.

Groenewald, R. and Breytenbach, A., 2011. The use of metadata and preservation methods for continuous access to digital data. The Electronic Library 236-248.

Gunnlaugsdottir, J., 2009. The human side of ERMS: an Icelandic study. Records Management Journal.

Hockx-Yu, H., 2006. Digital preservation in the context of institutional repositories. Program.232-243.

Husain, I., 2000. Pakistan: The economy of an elitist state. OUP Catalogue.

Iantovics, L.B. and Zamfirescu, C.B., 2013. ERMS: an evolutionary reorganizing multiagent system. International Journal of Innovative Computing, Information and Control, 9(3), pp.1171-1188.

Kazmi, S.N.A., 2010, July. Factors influencing e-Governance implementation: Issues and challenges in Pakistan. In 2010 Fifth International Conference on Digital Information Management (ICDIM) (pp. 326-331). IEEE.

Kothari, C.R., 2004. Research methodology: Methods and techniques. New Age International.

Cohen, J., & Grifo, J. A. (2007). Multicentre trial of preimplantation genetic screening reported in the New England Journal of Medicine: an in-depth look at the findings. *Reproductive biomedicine online*, *15*(4), 365-366.

Kundi, G.M. and Shah, B., 2009. IT in Pakistan: Threats & opportunities for eBusiness. The Electronic Journal of Information Systems in Developing Countries, 36(1), pp.1-31.

Lazinger, S., Negin, B. and Berman, Y., 2002. Preservation of electronic records in Israeli government offices. Journal of Government Information, 29(5), pp.319-331.

Lee, T. T. (2006). Adopting a personal digital assistant system: application of Lewin's change theory. *Journal of Advanced Nursing*, *55*(4), 487-496.

Lewis, S., Passmore, J. and Cantore, S., 2016. Appreciative inquiry for change management: Using AI to facilitate organizational development. Kogan Page Publishers.

Liamputtong, P. and Ezzy, D., 2005. Qualitative research methods. Second. Melbourne: Oxford university press.

Creswell, J. W., & Clark, V. L. P. (2017). *Designing and conducting mixed methods research*. Sage publications.

Liu, P.C.H. and Acharya, S., Syncsort Inc, 2011. System and method for high performance enterprise data protection. U.S. Patent 7,937,547.

Silverman, D., & Marvasti, A. (2008). *Doing qualitative research: A comprehensive guide*. Sage.

Malik, A., 2007. Effectiveness of regulatory structure in the power sector of Pakistan (No. 2007: 25). Islamabad, Pakistan: Pakistan Institute of Development Economics.

McCardle, P.E. and Chhabra, V.E., 2004. The voice of evidence in reading research. Paul H Brookes Publishing Co.

McDermott, R., 2011. Internal and external validity. Cambridge handbook of experimental political science, pp.27-40.

Mihlrad, L., 2010. A brief introduction to ERMS. Journal of Electronic Resources in Medical Libraries, 7(2), pp.151-158.

Moloi, J. and Mutula, S., 2007. E-records management in an e-government setting in Botswana. Information Development, 23(4), pp.290-306.

Nanda, V.P., 2006. The “good governance” concept revisited. The ANNALS of the American academy of political and social science, 603(1), pp.269-283.

Ndenje-Sichalwe, E., Ngulube, P. and Stilwell, C., 2011. Managing records as a strategic resource in the government ministries of Tanzania. Information Development, 27(4), pp.264-279.

Nguyen, L.T., Swatman, P. and Fraunholz, B., 2007. EDMS, ERMS, ECMS or EDRMS: fighting through the acronyms towards a strategy for effective corporate records management. ACIS 2007 Proceedings, p.122.

Clark, V. L. P., & Ivankova, N. V. (2015). *Mixed methods research: A guide to the field* (Vol. 3). Sage publications.

Adhabi, E., & Anozie, C. B. (2017). Literature review for the type of interview in qualitative research. *International Journal of Education*, *9*(3), 86-97.

Pappel, I., Pappel, I. and Saarmann, M., 2012, June. Digital records keeping to information governance in Estonian local governments. In International Conference on Information Society (i-Society 2012) (pp. 199-204). IEEE.

Qureshi, Q.A., Qureshi, N.A. and Khan, I.U., 2014. E-Readiness: a critical factor for successful implementation of Ehealth projects in developing countries like Pakistan. Gomal University Journal of Research, 30(2), pp.77-86.

Riley, C.G., 2003. The Changing Role of the Citizen in the E-governance and E-democracy equation. Commonwealth centre for e-governance.

Kelle, U. (2006). Combining qualitative and quantitative methods in research practice: purposes and advantages. *Qualitative research in psychology*, *3*(4), 293-311.

Simon, J.C., 2015. Building your own ERMS. Library Hi Tech News.

Sterling, L. and Taveter, K., 2009. The art of agent-oriented modeling. MIT press.

Simon, H. A. (1966). Theories of decision-making in economics and behavioural science. In *Surveys of economic theory* (pp. 1-28). Palgrave Macmillan, London.

Pappel, I., Tsap, V., Pappel, I. and Draheim, D., 2018, November. Exploring e-services development in local government authorities by means of electronic document management systems. In International Conference on Electronic Governance and Open Society: Challenges in Eurasia (pp. 223-234). Springer, Cham..com

Thurston, A., 1997. Records management as a public sector accountability function. International Journal of Government Auditing, 24(4), p.7.

Henriksen, H.Z. and Andersen, K.V., 2008. Electronic records management systems implementation in the Pakistani local government. Records Management Journal.

Saunders, M. N., Lewis, P., & Thornhill, A. (2019). *Research methods for business students* (8th ed.). Harlow: Pearson.

Wahl, M. F., & Durst, S. (2022). Digital ownership strategies: The .comhealth care services case. In F. Matos, P. M. Selig, & E. Henriqson (Eds.), *Resilience in a digital age: Contributions to management science* (pp. 137–158). Cham: Springer. doi:10.1007/978-3-030-85954-1_9

Karanika-Murray, M., & Biron, C. (2020). The health-performance framework of presenteeism: Towards understanding an adaptive behaviour. *Human Relations*, *73*(2), 242-261.

APPENDICES

Appendix 1. Interview manual

1. Does your department have Electronic Record Management System implemented?

If yes, can you briefly tell what kind of data and records are stored electronically?

What kind of places (like Drive, Databases) are used for storing data?

If there is a hybrid procedure, then approximately how much data is stored electronically and on paper?

2. How do you communicate with other departments?

If electronically, which mediums (emails, memos etc.) are used?

If on paper, how are they delivered?

3. In your department, how many employees use online repositories?

Does the Nursing staff trained to use electronic documentation?.com

If not, who stores data on online databases?

4. What are your comments on the existing Electronic Record management in:

Local Government of Pakistan generally.

In your department specifically.

Do you see the scope of ERMS in the future?

5. In your opinion, what will be the challenges/barriers in the implementation of ERMS?

Any suggestions or recommendations?

Appendix 2. Interview transcripts

Transcripts along interview recordings are available on the following link along descriptive analysis of non-numerical data, codes, sub- themes also data collected by online survey in excel sheet:

https://drive.google.com/drive/folders/13xeTCt_-fHNhVux93NZ0TIOZKoPybp3r?usp=sharing

Appendix 3. Survey manual

Q#1: Do you believe that technology is an essential part of our daily routine?

Yes

No

Maybe

Q#2: What are the main issues that currently Civil Hospital's faces in its daily workflow?

(Choose as many)

Lack of Skilled STAFF

Lack of material resources

Lack of digital Infrastructure

Communication inefficiency

Bureaucracy and hierarchy Structure

Lack of Quality Control

Corruption

Other

Q#3: Can you tell why Civil Hospital's reputation in patient care and services has deteriorated?

(Choose as many)

Delay in complain resolution

Extra billing

increase death rate of patients

Poor Interventional procedures

Incompetent service

Inefficient Registration System

Corruption

Other

Q#4: Do you think that the methods of record keeping can be improved in civil?

Yes

No

Maybe

Q#5: Do you believe that ERMS can be a solution for Civil Hospital to increase efficiency? *

Yes

No

Q#6: Do you think government should support the enrolment of ERMS in all other health sectors?

Yes

No

Not Sure

Q#7: What will be the positive effects of ERMS enrolment in Civil?

Q#8: What will be the negative effects of ERMS enrolment in Civil hospital adapt to new technological systems?

Yes

No

Q#10: Do you think that the department of Civil has the necessary IT infrastructure for the enrolment of ERMS? *

Yes

No

Not Sure

Q#11: Do you think that the workforce in Civil has the IT skills to manage a paperless record

management system? *

Yes

No

Not Sure

Q#12: Do you think Civil hospital's employees will demonstrate resistance to change while enrolling ERMS?

Yes

No

Not Sure

Q#13: Do you think it will be helpful if there is a centralized ERMS for all the departments of the government?

Yes

No

Maybe

Q#14: Do you think that enrolment of ERMS in different government departments will help in Good Management (Transparency and Accountability)?

Yes

No

Maybe

Q#15: In your opinion, what are steps the government of Pakistan should take in order to facilitate the adaption of ERMS? Make suggestions.

Appendix 4. Themes created

Themes made from data collected from 4 more interviews and 10 previous interviews collectively:

Implementation of ERMS
IT infrastructure
Effectiveness and Efficiency
Transparency and Reliability
Therapeutics at Civil Hospital
Appointments to consultants
ERMS as a solution

Appendix 5. Interviewee names and designations

#	Interviewee name	Designation	Date and time	Place	Transcript
1	Dr Deeba khan	Post graduate Trainee (medicine)	03 March, 15:00-15:10	Skype	link
2	Ghazanfar Ahmed	Chest Specialist	10 March, 11:00-11:15 A.M	Whats app call	
3	Maham Qureshi	Resident Medicine	11 March, 14:00-14:20	Whats app call	
4	Asad khan	Intern Medicine	15 March 13:00-13:30	skype	
	Interviews done in 201				
1.	Mr. Ghulam Haider	Assistant Superintendent Medical ward.	1st Sep 2021 14:30-14.45	Skype call	
2.	Mr. Janfishani	Assistant to MS	10 Sep 2021 11:00-11.20 A.M	Skype call	
3.	Dr Bader Faiyyaz Zuberi	Gastroenterologist	11 Sep 2021 10:00-10:30	Skype call	
4.	Dr Mati Ur Rahman	Chest Specialist	13 Sep 2021 11:00-11-20	Skype call	
5.	Dr Sharaf Ali Shah	Diabetologist	13 Sep 2021 14:00-14.20	Skype call	
6.	Dr Ubaid Salam	General Physician	15 Sep 2021 10:30-11:00 A.M	Whats app call	
7.	Dr Sohail khan	PG general Surgery	15 Sep 2021 14:00-14:15	Skype call	
8.	Dr Summaiya zameer	PG general medicince	16 Sep 2021 10:00-10:15 A.M	Skype call	
9.	Dr Dua khan	PG medicine	16 Sep 14:00-14.20	Whats app call	
10.	MS Bisma zameer	Head of nursing staff	17 Sep 11:00-11:15 A.M	Whats app call	

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