

ICT Implementation in the Judicial System of Pakistan: A Case Study

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Abstract: In this case study, we analyze the use of ICT implementation in the judicial system of Pakistan: A Case Study. The study investigates the benefits and challenges of ICT in the judiciary of Pakistan, and how the workflow of automation has been adopted systematically for the maturity model. Study identify that how it is a benefit to the public and what type of information may be extracted and how? The study shows that the National Judicial Policymaking Committee (NJPMC) plays a crucial role in the automation of the judiciary, and the need for a system that consolidates all information and collects information for all judiciary data into one location. The study proposes a model for potential creation and production of a bird's eye view for the current method, which aids the researcher in data collection and opens a new research direction. Unstructured interviews and personal observations were conducted with lawyers, judges of district judiciary officers of superior courts, and government organizations. The study demonstrates how ICT assists in understanding the status of cases, devising strategies and new reforms to improve the judiciary, determining the cause of delays in the disposal of court cases, and reducing the backlog of cases. The findings of this study can inform policymakers and stakeholders about the benefits and challenges of ICT in the judicial system of Pakistan, and provide insights into potential areas for improvement.

Keywords: Judiciary, Automation, ICT, Covid-19 ICT

I. Introduction

Information and communication technologies (ICT), is the technology for bridge for judicial information that helps for decision-making and data collection. Information and communication technology ICT helped to improve the education system in teaching and learning [1]. It is mandatory to form rules for implementation of ICT initiative, it is not all initiatives succeed due to lack of assessment on the use of ICT and rules [2]. Many initiatives are started in the I.T. sector around the world, and billions of rupees are invested in them, but many of them fail. Some companies outsource projects, but they still struggle for a variety of reasons, one of which is the effect of project and team characteristics on project success and failure [3]. The judiciary also initiates various projects, some of which fail and others which succeed, and in this study, we look into the projects and implementation of ICT in the judiciary.

Many studies are being conducted in various areas of the legal system, but the capacity of judges and lawyers to comprehend the situation and analysis the problem's outcome remains in the minds of humanity. An expert system can perform better than any human does [4]. A computer can never discriminate any decision computer always work on an algorithm defined inside it. The decision of the Judge can be made emotionally or by the situation. A legal A. I base system will assist the judge on how and where this problem solved. Besides, with this automation in the field of the judiciary of Pakistan and the data will help in decisions of the legal policies and law amendment and improvement.

In [5] author investigate white-collar crime such as corruption bribery, he investigates and adopted hypothetical deductive approach by using the General theory of deterrence (GTD), the analysis suggested that ICT influence on corruption, but ICT investment may have limited effect on corruption unless appropriate ICT law introduce.

Artificial Intelligence can help in reviewing and reading huge amounts of data and find out the relevance of documents. A. I enable legal researcher, Judges and lawyers focus on the main domain, rather than on research work [6].

The Pakistan Judiciary system is a hierarchical collection of courts, each court has its workflow, and automation of all courts required some standards to adopt one system. So all stakeholders should be on the same page to avoid clashes. The system will fail

if a clash occurs among stakeholders, it is impossible to define boundaries for each court [7].

The function of the National Judicial Policy Making Committee (NJPMC) including improving the capacity and performance of the administration of justice. Setting the performance standards of the judicial officers and persons associated with the judiciary. Publishing the annual and periodic reports [8]. After the direction of NJPMC, almost all superior courts and district judiciary data is available on respective websites of courts.

Until 1999, most users were trained on typewriter machines to generate cause-lists (Schedule of the court on which case to be heard) and other court documents typed on typewriter machines.

Few courts were chosen for basic features cause-list around 2005. The stenographer, court clerk, and other court employees refused to accept the move, which was a significant change for them. They assumed that computers would take over their jobs and that they would lose their jobs. The biggest challenges of that time to provide resources such as a computer system, basic training of the staff and other required equipment to each user. Different training of staff were conduct, including word processing and spreadsheet.

In the twentieth century, typewriters and ATMs were synonymous with feminized characteristics, and technology has always been a favorite topic in industry. It was also perceived as suitable technology for women in the middle class. As a means of attracting female workers to the information workplace [9].

It all began in the early 1950s, when technical companies began marketing directly to law firms. Thomas Edison invented sound recording on a microphone in 1877 with the invention of the phonograph, a machine that captured and played back everything it 'heard.' However, it was not until 1953 that dictated devices were specifically sold to law firms that it became known in the legal sector. It proved to be a very self-sufficient process,

allowing the lawyer to transcribe the information as required [10].

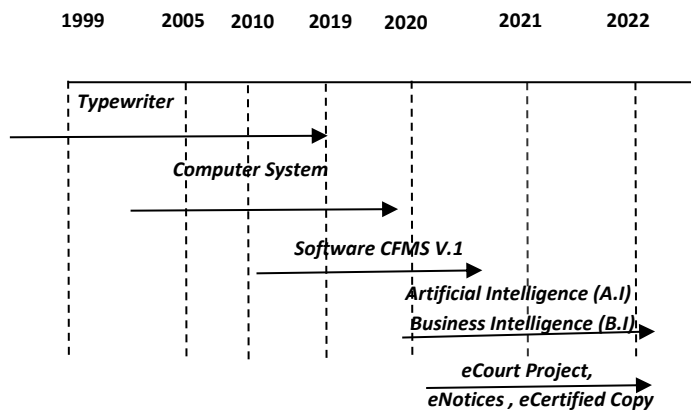


Figure 1 Journey of Automation in Judiciary of Pakistan

“Figure 1 Journey of automation in Judiciary of Pakistan” depicts how ICT was introduced in Pakistani Judiciary and how data was obtained and judiciary data was stored on the system. Between 2010 and 2015, the method developed into computerization of each scenario.

Between 2010 and 2015, two provinces were able to have at least one computer per court, and the remaining provinces met that target in end of the 2015. Fortunately, around 2010-2011, automation fully replaced a legacy framework, Case fixation (case to be heard on the same day) information is shared via SMS and email. Almost all courts implemented HRMS, stock control, file monitoring, and case database systems in parallel with other systems.

The National Judicial Policy Making Committee (NJPMC) directed all superior courts in 2012 to enroll all litigants and deponents on the system, record thumb impressions and recent photographs, and verify via the National Database and Registration Authority (NADRA). As a result of this scheme, there has been a substantial decrease in unnecessary litigation. Sindh Province was the first to introduce the scheme in 2012, and other provinces soon followed until 2015.

The Pakistani judiciary entered the next process of computerization or digitization in mid-2015, with the formalization of various policies and data collection standardization.

The data collected by the computer system, as well as the reports produced by the system, become an authenticated source of knowledge. The Pakistan judiciary began collecting analytical/statistical data from saved information in the beginning of 2019, using various information retrieval and Machine Learning techniques. The framework makes use of natural language processing software.

At the same time, some courts, such as the Lahore High Court, began experimenting with Business Intelligence software in order to produce analytical reports. With the assistance of a funding agency, the Peshawar High Court launched a new

initiative to collect data from all districts in order to centralize the framework for district courts in Khyber Pakhtunkhwa (KPK).

5 Optimizing	The Information/knowledge is use by end users, advocates, Judges and researcher. Initiate new project use of Artificial Intelligence (2020-2022).
4 Quantitatively Management	Data Collection and record Policies were introduced. Data from the system was officially used. 2015-2019
3 Defined	The direction of NJPMC (National Judicial Policy Making Committee) was given for the standardization of digital data. 2012-2015
2 Managed	Infrastructure was developed, at least one computer in each court provided 2010
1 Initial	The journey of Automation started in the judiciary in late 1999 in some courts.

Table 1 Maturity Model of Automation of Judiciary

In “Table 1 Maturity Model of Automation of Judiciary” showing that from 1920 to 2022, the maturity of Judicial Automation is seen, demonstrating how the mechanism matures over time. In the beginning, all provinces will use an official email address to replace faxes as a source of information and correspondence. The second step in establishing infrastructure for communication is to link computers, networks, and the internet. The High Court of Sindh created a distributed application for a Cause list (a list of cases to be heard) and the first web-based application for public access in the second process.

Without any ICT policy implementation, it is impossible to succeed in the third step of ICT implementation in any organization. As a result, from 2012 to 2015, NJPMC implemented a variety of guidelines and policies.

The maturity model is now in its fourth step. If the data has been managed, it is time to put it to use. NJPMC began collecting data in the form of excel reports in 2015, after which packaged reports were sent in soft form from 2015 to 2017.

About 2019, judges and senior members of the court visited other countries' court models, such as the Chinese e-Court model, the United States of America Federal Judicial Center (FJC), and the LexisNexis head office. In 2020, Pakistan's Supreme Court propose a video conferencing framework for case hearings. Approximately 500,000 rupees were saved by using it on each hearing. Former Chief Justice Asif Saeed Khosa speaks at the National Center for Artificial Intelligence - NCAI, Pakistan, about the use of artificial intelligence in the field of justice. Keyword search, Topic prediction, and judgement order

summarization are some of the A. I methods that have been implemented in various courts' CFMS systems.

Automation was expediting especially after the Judges-

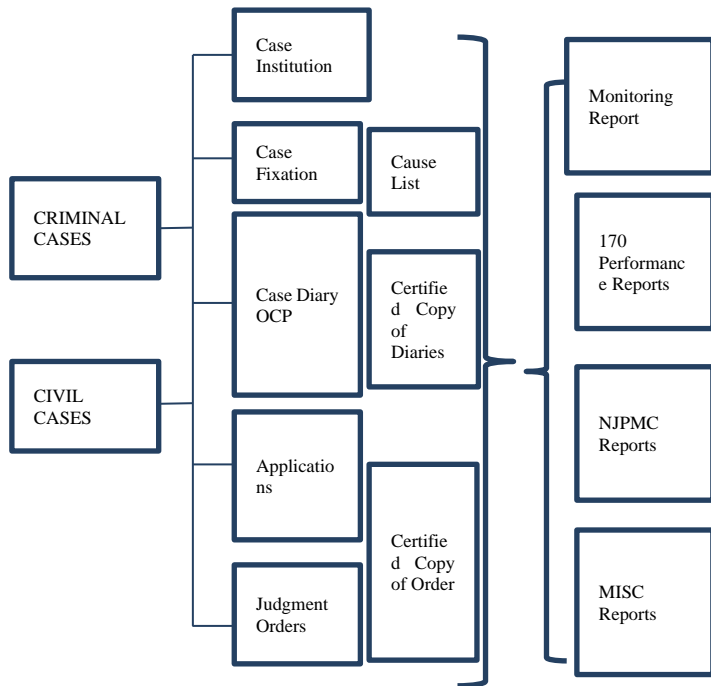


Figure 3 Modules of Case Flow Management System

Restoration Movement (2007-2009), to reduce the backlog and streamline the judicial system in the country, and make it responsive to the present-day requirements of society, the National Judicial Policy 2009 was framed. The Policy was formulated by the National Judicial (Policy Making) Committee, headed by the Chief Justice of Pakistan, with Chief Justices of Federal Shariat and High Courts as members [11].

II. Methodology

The research methodology for this project utilizes a mixed-methods approach to study the implementation of information and communication technology (ICT) in the judicial system of Pakistan. The study is designed as a case study and will investigate the policies of The National Judicial Policymaking Committee (NJPMC) and the National Judicial Automation Committee (NJAC) in implementing ICT in Pakistan's judiciary.

The data collection methods for this study will include both qualitative and quantitative research methods. Qualitative methods, such as unstructured interviews and personal observations, will be used to collect data from attorneys, district judges, and superior court officers. These data collection methods will provide in-depth insights into the implementation of ICT in the judiciary system and help to identify potential challenges faced by the stakeholders.

Quantitative research methods will be used to collect official data from the websites of Pakistan's Law Justice (ljcp.gov.pk/nljcp/home), Supreme Court of Pakistan (https://www.supremecourt.gov.pk/), Lahore High Court (https://www.lhc.gov.pk/), High Court of Sindh (https://sindhhighcourt.gov.pk/), Peshawar High Court (https://www.peshawarhighcourt.gov.pk/app/site/), Balochistan

High Court (https://bhc.gov.pk/), and Islamabad High Court (https://www.ihc.gov.pk/). The data collected will be analyzed to evaluate the policies and procedures established by NJPMC and NJAC. Additionally, content analysis will be used to analyze the data collected from the websites to identify trends and patterns in the implementation of ICT in the judicial system.

The findings of this research project will be used to evaluate the effectiveness of the policies and procedures established by NJPMC and NJAC in implementing ICT in Pakistan's judiciary system. Additionally, the study will identify potential areas for improvement in the implementation of ICT in the judicial system. The results of this study may also contribute to the broader literature on the implementation of ICT in the judicial system in developing countries.

III. Literature review

In early 2015 law justice, commission of Pakistan prepared a "situational analysis report" on the automation of the justice sector of Pakistan. The report collected information from all justice sector organization such as (i) Judiciary (ii) Police, (iii) Prosecution, (iv) Federal Ombudsmen, (v) Prisons and (vi) Parole and Probation Departments through an exhibition held on 6, September 2015 in which representative were invited to show their views [12]

Headnotes are the precise explanation and summary of legal points in an issued judgment. This thesis designs, develops and evaluates headnote prediction using machine learning. It uses text classification algorithms to predict law points and text summarization techniques to generate a summary of the judgment. The system achieves 65% accuracy using Linear Support Vector Classification with trigram and without stemmer [13].

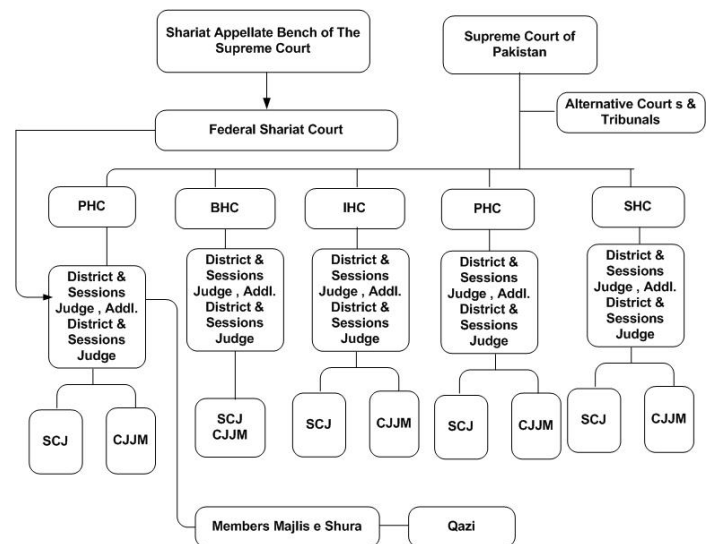


Figure 2 Hierarchical Structure of Judiciary by Law Justice of Pakistan

Hierarchical structure of Judiciary of Pakistan is shown in "Figure 2 Hierarchical Structure of Judiciary by Law Justice of Pakistan" top most courts are Supreme Court and Shariat Appellate Bench of Supreme Court and then High courts and drill down to District and Session Judge (DJ), Additional Session Judge (ADJ), Senior Civil Judge (SCJ), Civil Judge and Judicial Magistrate.

To check surety documents for vehicles, the Case Flow management system integrated with different stack holders such as excise and taxation of provinces. The Board of Revenue of Provinces for property verification, NADRA for individual verification and other stakeholders in Pakistan's judiciary have all contributed to a substantial reduction in malpractice.

Figure 3 “modules of Case flow management System” show that in an automated framework, cases are usually divided into two different categories: criminal cases and civil cases, and after pre-trial and document conditions, objection, challan, and investigation procedure, the first step in every case is to file a new case named "Case Institution" after the Casefile or Institution. The case hearing is the next step (when the case to be heard before the Judge).

Following the resolution of the case, the case diary is filled out on the system by concerned personnel, and there is also the possibility of introducing new applications to the system. After the case has gone through all of the procedural steps, the case is ultimately decided in favor of one of the parties, and the final stage of the case documents the Judgment/Order on the scheme. The Sindh district judiciary, for example, prints QR codes on their judgments. Following the decision in the case, all parties normally need a certified copy of the decision. Following the case's decision, there are several reports for assessing results, tracking reports, and other reports, with about 8 reports produced by all courts under the direction of the NJPMC, and other 250+ reports are developed by CFMS-DC Sindh for performance evolutions and progress of the cases.

When the second edition of web-based software (CFMS-DC) for the Sindh high court was introduced in 2012, the number of cases pending in Sindh's District Courts was around 1, 15,500, 1, 11,192 in March 2017, and 96,000 in December 2020. This demonstrates how automation has aided in the reduction of case pending times.

and has its own database. Proposed work to create a central database at the national level is currently being considered.

Traditional law is being practiced in different ways as a result of digitalization, and it is even being replaced in some cases. The article refers to the need to ensure, among other things, the consistency of data and algorithm framework on the market, which is currently emerging new technology (integrity, safety and security, absence of bias and discriminatory parameters, etc.). The topic includes an overview of German legal automated administrative decisions as well as an alert about sanction violations. [14].

It's difficult to combine artificial intelligence and the rule. Legal reasoning is rule-guided rather than rule-governed; legal terms are open-textured; the legal question can have many answers; and the legal question's response can change over time. He also logged a general view of how AI as law works, and how logic and probability of AI work in AI as mathematics. As a technology, AI can be tested on massive, carefully labelled data sets using a rule-based expert system or a Machine Learning algorithm. In terms of AI as psychology, one may consider cognitive modelling or smart, humanlike algorithms, which are often referred to as cognitive computing [15].

In every adjudicatory, discussed equitable and codified justice is present. The equal justice system is based on discrete judicial decisions made in particular cases. The discretionary control must be justified and is subject to limitations. Codified justice is based on predetermined variables, whereas other evidence and circumstances discovered in particular cases are ignored [16].

4.1 Access to Case Information

Case Search Engine on the official websites <https://www.sindhhighcourt.gov.pk>, [HTTPS:// bhc.gov.pk](https://bhc.gov.pk), <https://lhc.gov.pk>, <https://phc.gov.pk>, ihc.gov.pk, and <https://www.supremecourt.gov.pk/> makes access to case information for Judges, Advocates, Court Staff, and Litigant Public Free, Simple, and Instant.

These websites are typically multilingual, with English, Urdu, and Sindhi being the most popular languages. The website's cause-lists are also available in PDF format. On the website, you can find court-by-court cause lists, advocate-by-advocate cause lists, Additional Registrar (OS), by-Nazir-Judgments, Orders, Case Diaries and Court Proceedings are also available online.

Some courts have judgments or orders that can be verified electronically using a QR code. Mobile auto-generated emails and SMS. In courthouses, ATM-style Touch-Screen kiosk Machines are mounted. For court hearings, large LCD/TV screens have been mounted in the courtroom. Almost all supreme courts have computerized public information desks.

4.2 I.T Training/Orientations

About 1999, training was undertaken to educate court personnel and judges in all courts, and these pieces of training are replicated on an as-needed basis. From 2000 to today, once a new application or its module was introduced in a Branch/Office, the Court workers received various I.T. training. The most recent

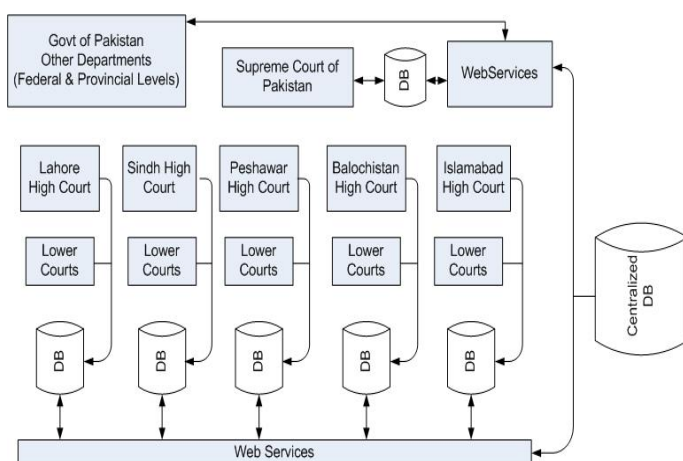


Figure 4 Proposed structure of Case Flow Management

“Figure 4 Proposed structure of Case Flow Management” showing the proposed automation mechanism by the NJPMC (National Judicial Policy Making Committee). As seen in Figure 4, all high courts have a system that is shared with lower courts

intensive I.T. training session for all Court Officials was held in 2016.

When the second and third versions of the CFMS-DC were released in 2007 and 2012, all Judicial Officers and Court Staff from all District Courts in Sindh received I.T. training.

When the third web-based edition of CFMS-DC was launched on the directions of NJPMC in 2012, I.T. training of Master Trainers from High Courts, Police Departments, Prosecution and Prisons of all Provinces was held at Federal Judicial Academy, Islamabad.

From time to time, the Sindh Judicial Academy provides I.T. training and CFMS orientation to newly appointed Civil Judges/Judicial Magistrates. Other Judicial Officers, including District and Sessions Judges, receive I.T. training and orientation on CFMS at Sindh Judicial Academy during their refresher training. The most recent training took place in March of 2019. After March 2019, no training was started due to Covid-19.

4.3 Infrastructure

The infrastructure is always required for any ICT we divide infrastructure into five parts. Software for court management and case management. Network LAN local area network and WAN wide area network to access the information from all around the world. Hardware required for server and client use, including network equipment. Every hardware and software need a maintenance plan for hardware and software otherwise all investment will be baseless once it ignored [17]. Data is more important in the 21st century so the security for that data is mandatory and it is the primary responsibility of the I.T department of each court [18].

In this report, distributed architecture is used to build infrastructure for the automation of the Pakistani judicial system, and advanced ICT is moving toward cloud computing because it is low-cost and efficient. We still have some problems with cloud computing, such as data security and public data protection outside of the country, which is a major constraint for Pakistan's judiciary [19].

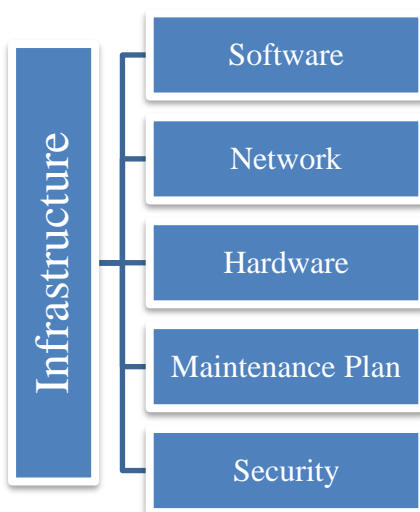


Figure 5 Infrastructure of the Judiciary

In “figure 5 Infrastructure of the Judiciary” showing, the five main infrastructure areas for judicial automation are shown in this diagram. To solve the Court's business logic, software was created. Correspondence and knowledge dissemination network to establish access on internet for the public. Hardware, switches, servers and personal computers. The maintenance plane for software and hardware, as well as software protection, is the most critical part of the infrastructure.

4.4 Implementation of A.I

From 2015 to 2020 During the last five years on average **3.0 Million** cases are registered annually throughout Pakistan in all courts. On average **2.97 Million** cases are decided throughout Pakistan annually.

On average **220K** cases are decided annually at Superior Courts (Supreme court and Five High Courts) 100% of case data is available in digital format for Superior Courts This data includes case information, case processing details, court orders, and the final judgments.

In 2000/2001, the courts began to be computerized. The study in the field of AI for the judiciary began in January 2019, with NJPMC enlisting the help of well-known universities. The process began at the Supreme Court and has since spread to other high courts. Following the initial testing, the classification and data cleaning process began. The initial scope of the application was established, and it was agreed to restrict it to only the decisions made. The spectrum was further narrowed for final judgments to

- Preparation of Head Note of Judgement
- Preparation of search Judgments on Keywords used within the Judgement

Based on the initial work and defined scope Datasets were prepared.

The model was created and tested using the appropriate data sets. The model was tested with test data and checked against expected performance. The initial results were positive, with a 30% relevancy rate. Further preparation and design modifications improve the relevancy from 30% to 45, 60, and finally 70%.

4.5 Steps Taken for Quick Dispensation of Justice

Provision of Video Link case hearing facilities to reduce the cost for litigants. using the automation system to reduce delays by assisting courts with more relevant and accurate information. removing fake litigation by incorporating real-time identity verification with the National database. Real-time identity verification to discourage fake witness appearances. ADRs at the District level within the Police department (Complaint Redresser System)

IV. Conclusion

ICT implementation in Pakistan's judiciary increases the quality of justice dispensation and provides low-cost access to justice for all. The respective courts' websites publish diaries,

progress reports, and judgments/orders. Data quality increases as a result of ICT implementation, and actual data is tracked as a result of that procedure. It aids in the reduction of backlog, and all data is tracked using a variety of performance and tracking reports.

The contribution of this case study lies in its investigation and analysis of the use of ICT in the judicial system of Pakistan. The study provides valuable insights into the benefits and challenges of ICT in the judiciary, including its role in improving the efficiency of case management, reducing the backlog of cases, and providing a bird's eye view of the current method. The study also highlights the need for a system that consolidates all information and collects information for all judiciary data into one location. The proposed model for creating such a system can aid researchers in data collection and open new research directions. Moreover, the study sheds light on the importance of the National Judicial Policymaking Committee (NJPMC) in the automation of the judiciary and its potential role in future reforms. The findings of this study can inform policymakers and stakeholders about the potential benefits and challenges of ICT in the judicial system of Pakistan, and provide insights into potential areas for improvement. Overall, this case study contributes to the growing body of research on the use of ICT in the judiciary and provides a useful framework for future studies in this area.

V. Future work

Research work is still in progress and more application areas are being identified Auto-tagging, Document Authentication and Verification, identify Contradictory Evidence, Quality of Judgement being analysis, Performance of Judicial Officer concerning Qualitative decisions, Integration plan with other departments. The effect of automation on qualitative disposal may be analyzed. There are issues of case number there should be unique case number from Magistrate court, session court, high court and supreme court.

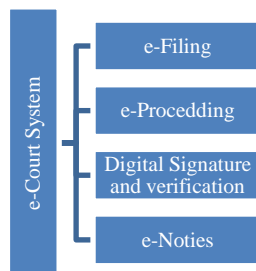


Figure 6 proposed future work

“Figure 6 proposed future work” demonstrating that all Pakistani courts should be e-Courts with e-filing, e-Proceeding via video conference, a system for digital signature is needed for judicial work, and e-Notices. Furthermore, law amendments for these processes are expected with caution.

VI. Acknowledge

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