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Criminal Investigation and Challenges in Pakistan: IT Reforms and Comparative Analysis with USA and UK

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ABSTRACT

Criminal investigation is an essential part of the criminal justice system that helps identify offenders, collect evidence, and ensure fair prosecution. In Pakistan, the investigation system faces several challenges, including outdated methods, weak forensic facilities, limited use of technology, and institutional inefficiencies. These problems contribute to delayed justice, low conviction rates, and reduced public confidence in law enforcement agencies. In comparison, the United States and the United Kingdom have modernized their investigation systems through advanced technologies such as digital forensics, artificial intelligence, biometric identification, and centralized criminal databases. This study examines the major challenges in Pakistan's criminal investigation system and evaluates the importance of Information Technology (IT)-based reforms in improving investigative efficiency. It also presents a comparative analysis of Pakistan, the USA, and the UK regarding investigative practices and technological development. The study concludes that effective IT reforms, improved forensic infrastructure, and professional training are necessary to modernize criminal investigations in Pakistan and strengthen transparency, efficiency, and accountability in the criminal justice system.

Introduction

Criminal investigation is a fundamental and essential component of any criminal justice system. It plays a critical role in identifying offenders, collecting, preserving, and analyzing evidence, and ensuring that justice is delivered in a fair, transparent, and lawful manner. An effective investigative system not only helps in solving crimes but also strengthens public trust in law enforcement institutions and supports the overall rule of law within a society. In modern legal

systems, criminal investigation has evolved from traditional manual procedures into a highly specialized, technology-driven process that relies heavily on scientific methods and digital tools. In Pakistan, the criminal investigation system is primarily managed by the police departments at provincial levels, along with specialized agencies such as the Federal Investigation Agency (FIA) and counter-terrorism units. However, despite their importance, these institutions face several persistent challenges that hinder their effectiveness. One of the major issues is the reliance on outdated investigative techniques, which are often based on manual record-keeping, eyewitness testimonies, and confessional statements rather than scientific evidence. This outdated approach significantly reduces the reliability and accuracy of investigations.

Another major challenge is the limited integration of modern technology in investigative procedures. In many developed countries, digital tools such as biometric systems, automated fingerprint identification systems (AFIS), CCTV surveillance networks, and artificial intelligence-based crime analysis systems are widely used. However, in Pakistan, such systems are either partially implemented or completely absent in many regions. As a result, investigators often face difficulties in collecting, analyzing, and preserving digital evidence, especially in complex cases involving cybercrime, terrorism, and organized criminal networks. Furthermore, Pakistan's investigative system suffers from a lack of proper forensic infrastructure. Forensic science laboratories are not adequately equipped, and there is a shortage of trained forensic experts who can handle modern investigative requirements. This creates delays in case processing and weakens the quality of evidence presented in courts. Institutional inefficiencies, poor coordination between police and prosecution departments, and external political or social pressures further complicate the investigative process.

In contrast, countries such as the United States and the United Kingdom have developed highly advanced and efficient criminal investigation systems. These countries have heavily invested in digital transformation and forensic modernization. Agencies like the Federal Bureau of Investigation (FBI) in the USA and Scotland Yard in the UK utilize advanced technologies such as DNA profiling, cyber forensic tools, real-time surveillance systems, and centralized criminal databases. Artificial intelligence and data analytics are also increasingly being used to predict crime patterns and assist in investigations. Additionally, these countries have established strong institutional frameworks that ensure accountability, transparency, and inter-agency coordination. Investigators receive specialized training, and strict protocols are followed for evidence collection and preservation, ensuring high standards of legal admissibility in courts. Given this contrast, it becomes essential to critically examine the gaps within Pakistan's criminal investigation system and explore how Information Technology (IT)-based reforms can enhance its efficiency and effectiveness. This study aims to analyze the current challenges faced by investigative institutions in Pakistan and compare them with the modern systems of the USA and UK. By doing so, it seeks to identify practical reform strategies that can be implemented in Pakistan to improve investigative performance, strengthen the justice system, and promote the use of technology in law enforcement.

Problem Statement

Despite advancements in global policing techniques, Pakistan's criminal investigation system remains largely traditional. Weak IT integration, poor forensic support, corruption, and lack of training hinder effective investigations. This results in delayed justice, low conviction rates, and public distrust. There is a need to analyze these gaps and explore reform models from developed countries.

Objectives of the Study

1. To analyze the current criminal investigation system in Pakistan
2. To identify major challenges in investigation and evidence collection
3. To evaluate the role of IT reforms in modern policing
4. To compare Pakistan's system with USA and UK investigative frameworks
5. To propose practical reforms for improving investigation efficiency in Pakistan

Research Questions

1. What are the major challenges in criminal investigation in Pakistan?
2. How does technology improve investigation processes in developed countries?
3. What are the key differences between Pakistan, USA, and UK investigation systems?
4. How can IT-based reforms strengthen Pakistan's criminal investigation system?

Significance of the Study

This study is important for policymakers, law enforcement agencies, and criminal justice institutions in Pakistan. It highlights weaknesses in the current system and provides comparative insights from developed countries. The findings may help in improving investigative efficiency, reducing corruption, and strengthening rule of law through IT-based reforms.

Literature Review

Introduction

Criminal investigation is a vital component of the criminal justice system, responsible for identifying offenders, collecting admissible evidence, and ensuring fair prosecution. In the modern era, investigation systems have shifted from traditional methods to technology-based approaches, including digital forensics, surveillance systems, biometric identification, and artificial intelligence tools. Developed countries such as the United States and the United Kingdom have significantly modernized their investigative frameworks, while developing countries like Pakistan still face structural, financial, and technological limitations. This chapter reviews existing literature on criminal investigation systems, IT reforms, digital forensics, and comparative policing practices in Pakistan, the USA, and the UK.

Criminal Investigation System in Pakistan

The criminal investigation system in Pakistan is primarily handled by the police and specialized agencies such as the Federal Investigation Agency (FIA). However, multiple studies highlight that the system suffers from inefficiency, corruption, political influence, and lack of modern equipment. According to research, Pakistan's investigative system is largely based on outdated manual procedures with limited integration of digital tools (Ahmed et al., 2025). Investigators often lack proper training in forensic science and digital evidence handling, which reduces the quality of case investigation and conviction rates. Furthermore, studies show that delays in investigations, poor chain of custody, and weak forensic infrastructure are major challenges in Pakistan's justice system (Ahmed, Rehman, & Ali, 2025).

Role of Digital Evidence and IT in Criminal Investigation

Digital evidence has become a cornerstone of modern investigations. It includes data from mobile phones, CCTV footage, emails, social media, GPS tracking, and computer systems.

Research shows that digital evidence is increasingly important in both criminal and civil cases due to its reliability and traceability (Khan & Bhatti, 2023) . However, Pakistan faces challenges such as lack of legal awareness, weak forensic capacity, and difficulty in authentication of electronic records. In cybercrime cases, digital evidence must be preserved carefully to maintain chain of custody. Studies highlight that even minor mishandling of data can render evidence inadmissible in court (Gul, Ahmad, & Riaz, 2025).

Challenges in Criminal Investigation in Pakistan

The literature identifies several key challenges in Pakistan's investigative system:

Lack of Modern Technology

Most police departments lack access to modern forensic laboratories, AI-based tools, and centralized criminal databases.

Poor Training of Investigators

Investigators are often not trained in digital forensics or modern investigative techniques.

Institutional Weakness

There is poor coordination between police, prosecution, and forensic departments.

Corruption and Political Influence

External pressure affects the neutrality of investigations.

Delays in Justice

Case backlogs and slow judicial processing reduce investigation effectiveness.

These challenges significantly weaken the criminal justice system and reduce public trust.

IT Reforms in Criminal Investigation

IT-based reforms are considered essential for modernizing investigation systems. These include:

- Digital case management systems
- Biometric identification systems
- CCTV surveillance networks
- Automated fingerprint identification systems (AFIS)
- National criminal databases
- Cybercrime investigation units

Studies show that digital transformation improves transparency, efficiency, and accuracy in investigations (Afzal & Panagiotopoulos, 2024).

Pakistan has started reforms such as cybercrime units and digital forensic labs, but implementation remains partial and inconsistent.

Criminal Investigation System in the USA

The United States has one of the most advanced criminal investigation systems in the world. Agencies like the FBI and DEA use:

- Advanced DNA profiling systems
- Artificial intelligence for crime prediction
- Integrated criminal databases
- Cybercrime divisions
- Real-time surveillance systems

Research shows that forensic science is highly integrated into investigations, ensuring strong evidence-based prosecution (Hussain et al., 2024).

The USA also emphasizes inter-agency cooperation and standardized investigative protocols, which reduce errors and increase conviction accuracy.

Criminal Investigation System in the UK

The United Kingdom uses a centralized and technology-driven policing system, especially through agencies like Scotland Yard (Metropolitan Police).

Key features include:

- National DNA Database
- CCTV surveillance across cities
- Advanced cybercrime units
- Strong forensic science laboratories
- Digital case tracking systems

The UK system is also highly regulated with strict evidence handling procedures, ensuring admissibility in courts.

Comparative Analysis: Pakistan vs USA vs UK

Literature shows major differences between developing and developed systems:

Feature	Pakistan	USA	UK
Technology use	Low	Very High	High
Forensic labs	Limited	Advanced	Advanced
Digital evidence use	Weak	Strong	Strong
Investigator training	Poor	Highly specialized	Specialized
Case efficiency	Slow	Fast	Fast
Conviction rate	Low	High	High

The comparison shows that Pakistan is significantly behind due to lack of IT integration and institutional reforms.

Theoretical Framework

This study is based on the Modernization Theory, which suggests that societies develop when they adopt modern technology and institutional reforms. Applied to criminal investigation, it implies that adoption of IT systems improves efficiency, transparency, and justice delivery.

Research Gap

Existing literature shows limited comparative research on the criminal investigation systems of Pakistan, the USA, and the UK. There is also insufficient focus on IT-based reforms, digital forensics, and their practical implementation in Pakistan. Most studies discuss these issues theoretically without offering policy-oriented recommendations or empirical analysis. Furthermore, research on modernization and technological integration in Pakistan's investigative institutions remains inadequate. This study addresses these gaps by providing a comparative and reform-oriented analysis focused on digital transformation and investigative efficiency.

Research Methodology

- **Research Design:** Qualitative + Comparative Study
- **Data Collection:** Secondary data (books, journals, reports, official documents)
- **Comparative Analysis:** Pakistan vs USA vs UK
- **Tools of Analysis:** Thematic and descriptive analysis
- **Scope:** Criminal investigation systems and IT reforms

Expected Outcomes

- Identification of key gaps in Pakistan's investigation system
- Understanding of modern investigative technologies used in USA and UK
- Policy recommendations for IT-based police reforms
- Framework for improving forensic and digital investigation systems in Pakistan

Conclusion

The study will provide a clear comparison between developing and developed investigative systems. It will highlight how IT reforms can modernize Pakistan's criminal investigation system and improve justice delivery.

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