



FORENSIC LINGUISTICS IN CRIMINAL INVESTIGATIONS IN PAKISTAN: CHALLENGES, OPPORTUNITIES, AND FUTURE DIRECTIONS

Sadia Saeed sadisaeed106@gmail.com	Lecturer in English, Govt. Associate College for Women Fateh Jang, Attock, Pakistan.
Farzana Kausar farzana.ma3@gmail.com	MPhil. Scholar, Department of English, University of Okara, Okara, Pakistan.
Sadia Younis sadiayounisoo5@gmail.com	MPhil Scholar, Department of English, University of Okara, Okara, Pakistan.

Abstract

Forensic linguistics has become an interdisciplinary discipline and is engaged in a range of legal and criminal investigations, using theories and analytical tools from linguistics. Although the field of Forensic Linguistics is becoming increasingly popular in the international arena, it has not been explored and applied sufficiently in the Criminal Justice System in Pakistan. This study critically analyses the existing role of forensic linguistics in the criminal investigation process in Pakistan with the objectives of highlighting the major applications of forensic linguistics in Pakistan, challenges faced by it in the institution and prospects for the future of the field in Pakistan. This study, designed using the qualitative systematic literature review method, summarizes the latest national and international academic publications that have been published in the last seven years (2020-2026). The reviewed literature was analysed using thematic analysis to find the themes that repeated themselves across the literature and were relevant to the authorship of the work, forensic stylistics, legal discourse, investigative interviewing, cybercrime and digital evidence. The study results indicate that forensic linguistics plays an important role in the field of criminal investigations as it is useful for the analysis of linguistic evidence, the interpretation of legal documents, authorship analysis and cybercrime investigations. In Pakistan, however, its application is limited due to poor institutional awareness, lack of specialized professional training, the absence of a group of linguists specializing in forensics and hence, lack of legal recognition of linguistic evidence and very few technological resources. The study also highlights new potential opportunities that are being created through developments in AI, corpus Linguistics, machine learning, and natural language processing, which could revolutionize the forensics industry. Based on the findings of this study, it is concluded that the capacity of forensic linguistics can be strengthened by institutional reforms, legal recognition, inter-disciplinary cooperation, academic development and technological advancements and this can significantly enhance the effectiveness, transparency and reliability of criminal investigations in Pakistan and aid in the modernization of the country's criminal justice system.

Keywords: *Criminal Investigation, Criminal Justice System, Forensic Linguistics, Linguistic Evidence, Pakistan.*

Corresponding Author: Sadia Saeed (Lecturer in English, Govt. Associate College for Women Fateh Jang, Attock, Pakistan)
Email: sadisaeed106@gmail.com

1. Introduction

Forensic linguistics has become one of the most rapidly expanding interdisciplinary areas of study that intersects with criminal justice, law and linguistics. Forensic Linguistics is a general term that describes the use of the theories, methods and analysis of language in legal and investigative settings where language is evidence. It covers a variety of fields such as authorship research, forensic phonetics, discourse analysis, police interviews, courtroom speech, plagiarism identification or research, trademark, ransom notes, suicide notes, internet communication, threat assessment, and much more. With the modern era of criminal investigations increasingly relying on textual, spoken and digital evidence, forensic linguistics is crucial tool in the toolbox of any law enforcement agency globally. In addition to physical evidence like fingerprinting or DNA, today investigators are learning to include language as another type of forensic evidence that can provide clues to identity, intent, deception and criminal involvement (Coulthard et al. 2017; Olsson 2008; Solan & Tiersma 2005).

Forensic linguistics has come into its own, with specific implications for criminal investigations in many jurisdictions, including the United Kingdom, Australia and the United States. Linguistic experts are regularly called upon to help courts and investigative agencies interpret threatening communications, analyze witness statements, evaluate police interviews, and identify linguistic manipulation in legal documents in the case of disputed authorship. As with other evidence, the value of linguistic evidence has grown over time, largely due to the combined developments of corpus linguistics, computational linguistics, artificial intelligence, and natural language processing, which allow investigators to analyse vast quantities of textual data with greater precision and reliability than ever before. Forensic linguistics has therefore grown from being a relatively specialized academic discipline to an applied forensic science which can be used in criminal investigation, judicial decision-making and the administration of justice (Coulthard et al., 2017; Johnson & Coulthard, 2010).

The ability to use language as evidence is one of the hallmarks of forensic linguistics. Each person has an individual pattern of language use, based on education, regional background, profession, multilingual competence and social identity. These

linguistic fingerprints can help determine who the anonymous author is, whether the text is authentic or fabricated, highlight deceptive passages, and provide linkages between multiple documents. Research in forensic authorship has shown that lexical, grammatical, syntactic, and discourse features, as well as spelling conventions, punctuation, and stylistic variation can often reveal identifiable characteristics of writers or speakers. In particular, language evidence has proven useful in computer-related crimes, such as cybercrime, terrorism, extortion, financial fraud, organized crime, online harassment, and anonymous online communication, where traditional evidence may be limited or nonexistent (Olsson, 2008; Shuy, 2006; Coulthard et al., 2017).

As communications have become increasingly digital, the field of forensic linguistics has grown and expanded. Emails, WhatsApp messages, Facebook posts, X (formerly Twitter) interactions, text messages, online forums, and encrypted digital platforms are the main channels of communication that are often used for criminal activities. These communications contain rich linguistic information that can be useful to investigators to determine communicative intent, ideology, social networks, temporal trends, and characteristics of the author. Forensic Linguistics is therefore becoming a more and more important branch to assist digital forensics by offering qualitative and quantitative analyses of language evidence which cannot be obtained through a purely technological approach. It has gained special importance in investigations related to cyber-enabled crimes and transnational criminal networks (Coulthard et al., 2017; Fadden, 2012).

Although forensic linguistics is a field that has been developed extensively abroad, it is still an emerging field in Pakistan's criminal justice system. In Pakistan the physical evidence, eye witness evidence, confessional evidence, medico-legal evidence and forensic laboratory examination have traditionally formed the backbone of criminal investigation. Linguistic evidence is found in all phases of criminal proceedings, such as First Information Reports (FIRs), police interviews, witness statements, confessions, legal notices, judicial opinions, and digital communications, but until now, it has been less systematically studied than other types of evidence. As a result, language evidence, which can be a critical component to a criminal investigation and accurate conviction, is frequently not used effectively. This difference presents an opportunity to effectively bring forensic linguistic skills to the fore in the investigative and judicial system of Pakistan.

Despite this, in recent years there is a noticeable academic interest in forensic linguistics in Pakistan as manifested in some scholarships. Anjum and Anwar (2023) employed forensic stylistic analysis of banking court judgments, revealing that the lexically and grammatically complex nature of Pakistani legal language makes it inaccessible and can potentially impact the interpretation of laws. Their results highlighted that forensic linguistic expertise might streamline legal communication and enhance communication transparency in institutions. Likewise, Zaman et al. (2023) examined 126

First Information Reports (FIRs) from the territory of Islamabad with the aid of corpus linguistic techniques and identified that FIRs are a unique genre of legal discourse with structural and linguistic features. All these studies indicate that the language of Pakistani legal texts has distinct linguistic characteristics which can be studied systematically forensically and draw general conclusions for the other fields of criminal justice.

There is also some emerging evidence on the institutional recognition of forensic linguistics in Pakistan, based on empirical data. Shakoor, Abid, and Sarfraz (2025) examined the attitudes of police officers and legal professionals towards the use of forensic linguistics in criminal investigations and found that their attitudes were generally positive with some obstacles. Participants acknowledged the value of linguistic skills in anonymous communications, cybercrime investigations, witness examination and in relation to documents. However, the study also revealed some important challenges such as limited awareness of the profession of academia, lack of specialized training of academic staff, lack of forensic linguistic experts in the investigative agencies, and poor cooperation between universities and law enforcement institutions. The results reveal that the acceptance of this is slowly rising but the implementation is still in its early stages.

This is corroborated by additional evidence from Pakistani forensic discourse studies. Recent research on courtroom language, judicial decisions and judicial processes indicates that the language used has a significant effect on witness credibility, court interpretation, institutional power and judicial rulings. Research that focuses on courtroom interaction has found asymmetries in communication between the professional and nonprofessional actors, and discourse analyses of judicial sentences reveal the role of language in the legitimation of institutions and legal reasoning. These investigations together establish that linguistic analysis is not merely a textual description but is a direct result of enhancing the understanding of legal decision making, evidential interpretation and procedural fairness in the criminal court system in Pakistan.

The importance of forensic linguistics has further increased in the wake of the rapid expansion of cybercrime, misinformation, hate speech, online radicalization, identity fraud, and digital crimes in Pakistan. The investigators are more and more frequently finding Urdu, English, Punjabi, Pashto, Saraiki, Balochi and local dialects, in the context of digital communication, emails, electronic messages, fake social media accounts, and threatening letters. Such multilingual contexts demand analytical skills for the detection of authorship, the understanding of discourse strategies, the detection of deception, and the contextualization of language usage in multilingual contexts. However, traditional investigative techniques have proven to be inadequate in the face of these challenges, and a need for digital forensic investigations combined with forensic linguistic techniques has grown.

Pakistan has progressed with great achievements in the area of development of infrastructure for forensic science in DNA analysis, Fingerprinting, Ballistic and Digital forensics, but still has not seen equal recognition of this field in the institutions. There are no specialized forensic linguistic laboratories, formal professional training programmes, accreditation procedures for experts and dedicated university courses that enable its use in investigative agencies and courts. Linguistic evidence is therefore largely unexplored, and it could be used in conjunction with the other forms of evidence to enhance the reliability of evidence in a case. University-Police-Forensic Science Agency-Judicial-State collaborations are necessary to establish uniform professional standards, methodologies, and laws concerning the admissibility of linguistic evidence for the strengthening of forensic linguistics.

In this context, the present study critically reviews the present status of the application of FL in criminal investigations in Pakistan, outlining the existing challenges in the field, future prospects, and recommendations for the incorporation of FL in Pakistan's criminal justice system. The research aims to show that forensic linguistics is not only a specialized branch of applied linguistics, but also an integral part of the modern criminal investigation which could play a significant role in strengthening the evidential analysis, enhancing procedures' fairness, and boosting the accuracy of investigation in Pakistan and would also contribute to the effective administration of justice.

1.1. Problem Statement

Even though forensic linguistics is increasingly acknowledged as a valuable tool of investigation in a criminal justice system globally, its use in Pakistan's criminal justice system is limited. Forensic linguistic analysis of linguistic evidence, such as that found in First Information Reports, witness statements, police interviews, judicial documents, and digital communications, is not typically undertaken in a systematic manner. Previous studies conducted in Pakistan have largely centered on the legal word and document analysis, and there is a lack of research on the integration of forensic linguistics into criminal investigations as a whole. Furthermore, there is still limited institutional awareness, inadequate professional training and no uniformity of forensic linguistic practices in its application. Hence, this study aims to explore the present status of forensic linguistics in Pakistan, its hindrances and prospects in strengthening its contribution to criminal investigations.

1.2. Research Objectives

The study aims to achieve the following objectives:

- a) To examine the current role and application of forensic linguistics in criminal investigations in Pakistan.
- b) To identify the institutional, legal, and practical challenges limiting the integration of forensic linguistics into Pakistan's criminal justice system.

- c) To explore future opportunities and propose recommendations for strengthening the application of forensic linguistics in criminal investigations in Pakistan.

1.3. Research Questions

The study seeks to answer the following research questions:

- a) What role does forensic linguistics currently play in criminal investigations in Pakistan?
- b) What institutional, legal, and practical challenges hinder the effective application of forensic linguistics in Pakistan's criminal justice system?
- c) What opportunities and strategic measures can facilitate the integration of forensic linguistics into criminal investigations in Pakistan?

1.4. Significance of the Study

The current study fills a void in the young field of forensic linguistics in Pakistan by providing an in-depth analysis of the forensic linguistics role in criminal investigations. It fills the void between international developments and the sparse literature available in Pakistan and draws attention to the potential of language in criminal investigations, judicial decision-making and cybercrime analysis. This research will be significant for research, law enforcement, legal profession, policy makers and academic institutions as it will provide practical insights and recommendations for introducing the use of Forensic Linguistics in the Pakistani Criminal Justice System and for future research and professional training in Forensic Linguistics.

1.5. Limitations and Delimitations of the Study

This study does not involve empirical data nor individual criminal cases as such; it is only a conceptual overview of existing national and international literature. It is limited to the study and application of forensic linguistics in the context of criminal investigations by highlighting the importance of linguistic evidence in legal documents, police investigation, witness statements and digital communication. This study does not cover other areas of forensic science and civil legal application.

2. Literature Review

In the last decade, forensic linguistics has experienced a significant expansion from a specialized area of applied linguistics to a multidisciplinary one that is of major value to criminal investigations, legal interpretation and digital forensic analysis. In addition to the study of legal language, the scope of modern forensic linguistics also encompasses computational linguistic analysis, courtroom discourse, cybercrime investigation and forensic phonetics, as well as authorship attribution and deception detection. Bibliometric evidence from recent times suggests that there has been a considerable amount of forensic linguistic research in the world and that language is being recognized as a useful source of forensic evidence. In their bibliometric study of publications in the Web of Science, Wasi et al. (2024) noted that forensic linguistics has grown rapidly in many fields, and the major

research areas are authorship attribution, legal discourse, speech recognition, and corpus linguistics. Similarly, the most recent systematic reviews show how technology has made forensic linguistics an interdisciplinary science that relies on linguistic theory alongside artificial intelligence (AI), machine learning (ML), and natural language processing (NLP) technologies, which has enhanced the effectiveness and accuracy of criminal investigations.

A major use of forensic linguistics is the investigation of linguistic evidence in a criminal investigation. Forensic linguistics is different from traditional forensic sciences, which rely on the analysis of physical evidence, because it deals with the analysis of written and spoken language to reveal communicative intention, authorship, deception, and ambiguities. Language evidence can consist of ransom notes, threatening letters, witness statements, police interviews, anonymous email, text messages, social media posts, and recorded conversations. Studies done recently abroad have put the value of language evidence in cybercrime, terrorism, fraud, online harassment and digital extortion cases on a higher level, as the offenders often leave traces of language that show individual writing style and communicative patterns. Recent studies also emphasize the value of linguistic evidence in addition to traditional forensic methods as a way of obtaining contextual information which cannot be obtained through physical evidence.

One of the most well researched aspects of forensic linguistics is that of authorship attribution. The underlying premise of authorship analysis is that every person has relatively unique features in his or her language use, such as lexical choice, sentence structures, punctuation, discourse organization, and style. The authorship comparison problem has seen tremendous progress in recent years as new computational linguistic tools and techniques have combined with machine-learning algorithms to make the task easier and more accurate. Recent research shows that deep learning models and computational stylometry can work well with larger sets of text data while still achieving high classification accuracy, compared with traditional manual methods. In addition, new research has started to tackle the issues raised by the emergence of AI-generated texts and collaborative human-human and human-machine text production, which calls for new analytical approaches that can differentiate real from synthetic language production. The innovations have added to the usefulness of forensic linguistics in anonymous digital communications and cyber enabled crimes.

Digital communication has become an emergent paradigm which has greatly influenced the field of forensic linguistic research. Crimes are being committed more and more via online platforms, encrypted messaging apps, social media networks and email communications, and generating a huge amount of textual evidence that needs to be linguistically interpreted. For this reason, in recent years, forensic linguistics research has increasingly incorporated Artificial Intelligence, Machine Learning and Natural Language

Processing into criminal investigations. The machine-learning methods can help investigators to process large amounts of data quickly, and also capture nuances in language that are hard to spot by hand. However, researchers also point to ethical issues of algorithmic transparency, bias, explainability and legality of automatically derived conclusions. Thus, researchers recommend hybrid investigation by a combination of computational efficiency and linguistic interpretation from experts in order to guarantee the scientific reliability and judicial acceptance.

Issues related to the use of forensic linguistics in legal discourse and in the courtroom are also current topics of research. Legal discourse frequently embodies institutional conventions, asymmetries between legal professionals and laypersons, syntactic complexity and technical terms. Modern forensic linguistic research suggests that the linguistic complexity can impact not only the witness's understanding, but also the participation of defendants, judicial interpretation, and fairness in the proceedings. Recent reviews have highlighted the importance of discourse analysis for the courtroom, police interviews, confessional statements, and judicial reasoning in the identification of ambiguity, coercion and communicative inequalities that can affect the law. As a result, courts are increasingly relying on forensic linguistics to help elucidate the meaning of contested words, to aid in the accurate interpretation of legal texts, and to enhance the way they assess evidence in criminal trials. Forensic linguistics therefore plays an increasing role in helping to clarify the meanings of disputed words, to aid in the accurate interpretation of legal texts, and to improve the way courts evaluate evidence in criminal trials.

Forensic Linguistics is an emerging discipline within Pakistan although there had been a growing interest in the area in recent years. Previous studies in Pakistan have focused on legal language, corpus linguistics and institutional perception, and have not adequately examined the use of forensic linguistic skills in a real context of criminal investigation. For instance, Anjum and Anwar (2023) performed a forensic stylistic study of the banking court judgments and discovered that Pakistani legal language is highly lexical and grammatical, which makes it difficult to understand and leads to misinterpretation. In the same way, Zaman et al.'s study of First Information Reports showed that FIRs are a specially scored genre of legal genre featuring recurring structural and linguistic features; thus, the necessity of corpus-based forensic analysis for legal documents. These studies highlight the importance of language in the Pakistani judicial system and the lack of institutional use of forensic linguistic technique in investigations.

The focus of more recent Pakistani research has been on the preparedness of institutions for the implementation of forensic linguistics. The study carried out by Shakoor, Abid and Sarfraz (2025) further revealed that the police officers and lawyers of Lahore had knowledge of the potential applications of forensic linguistics in criminal

investigations, but there was a problem of limited awareness and institutional problems such as lack of training, lack of experts and lack of policy support were still prevalent in utilizing the field. In a similar vein, Murad, Zawar, and Rehman (2024) stated that an analysis of the criminal intent (*mens rea*) can be greatly helped by following forensic linguistic evidence, especially when dealing with digital communication or recorded conversations that have been disputed. Overall, these studies show that forensic linguistics is slowly becoming a part of Pakistan's criminal justice system, albeit in a very limited and institutionally undeveloped way.

There has been a methodological shift from qualitative to computational/corpus-based approaches to forensic linguistics in recent scholarship. Though the manual analysis of lexical, syntactic and discourse features has been used in earlier research, more recent ones have increasingly turned to the tools of corpus linguistics, stylometry, machine learning and natural language processing to process large amounts of linguistic evidence. A recent narrative review found that machine learning models can significantly enhance the accuracy and efficiency of authorship attribution and deception detection tasks, and minimize human bias in processing large text corpora. However, studies warn that transparency, explainability and the admissibility of algorithms in court are significant issues, and that computational results should be used alongside expert linguistic analysis. The advancement of forensic linguistics is moving towards a future where linguistic knowledge is combined with computational tools to enhance criminal investigation and judicial decision-making.

A key research focus of today is the use of FL in cybercrime, cyber-fraud, hate speech, misinformation and electronic investigations. With the rise of social media platforms, encrypted messaging apps and AI-generated content, new linguistic forms of evidence have emerged that demand advanced forensic analysis. Recent research has suggested that digital communication leaves clear linguistic clues that can help investigators determine who is behind anonymous communication, allow for the detection of coordinated disinformation campaigns and provide insights into the meaning of threatening messages. Meanwhile, the rise of large language models (LLMs) has added a layer of complexity to the traditional methods of authorship attribution, as AI-driven writing is becoming so close to human writing that it makes identification more difficult. Scholars suggest that the combination of stylometric analysis, discourse analysis, explainable AI and forensic linguistic skills should be considered in the development of hybrid analytical frameworks as this will ensure the validity of the scientific and legal perspectives in criminal investigations.

In Pakistan, forensic linguistic studies have gained significant momentum since 2020, but the field has been mostly in academic settings and not institutional settings. In Pakistan, scholars have studied legal discourse, legal drafting, the judgments of the courts,

FIRs and language in the courtroom, showing that linguistics adds a lot to the understanding of legal interpretation and institutional communication. For instance, Khan and Khaleel (2024) demonstrated that the language of legal drafting for offences against women is frequently embedded with ideological and structural biases which have impacts on the interpretation of the law and public understanding. In a similar way, the recent forensic linguistic research on Supreme Court judgements in Pakistan shows that pragmatic rules, discourse organization and linguistic clarity directly impact the transparency and confidence of the court. Together, these studies demonstrate that language is not only a means of legal communication, but is also an important means of forensic evidence that can influence legal reasoning and judicial decision making.

Empirical research on the current readiness of the institutions to use forensic linguistics in the criminal justice system of Pakistan has also started recently. Shakoor, Abid and Sarfraz (2025) noted that the lawyers and the police officers were generally aware of the potential benefits of forensic linguistics in the analysis of anonymous communication, cybercrime, threatening messages, and documentary evidence. At the same time participants highlighted very strong institutional challenges such as lack of awareness, lack of language-specific professional training, lack of specialized forensic linguists, and lack of policy support for the use of linguistic expertise in investigative procedures. In the same vein, Murad et al. (2024) stated that forensic linguistic evidence can be used to gain insights into mens rea by analysing communicative intention in written and spoken language. The overall findings of these studies indicate that there has been an increasing interest in academic research on forensic linguistics in Pakistan but there is a lack of institutionalized structures to apply it in criminal investigations on a regular basis.

A new aspect of the forensic research in Pakistan is related to digital communication and media discourse. A number of studies have examined the effects of fake news, misinformation, political communication, and social media communication within the framework of forensic linguistics in recent years. In recent years, forensic linguistic approaches have been used in recent studies of fake news, misinformation, political communication, and social media communication. Tahir et al. (2025), for example, showed that emotive vocabulary, lexical ambiguity, sensational framing and manipulative discourse strategies are often used in disinformation campaigns in Pakistan to sway public opinion. The researchers' results demonstrate how forensic linguistic analysis can help investigators detect deceptive communication patterns, uncover coordinated misinformation, and enhance investigations of cybercrime. This type of study extends the applicability of forensic linguistics beyond the confines of courtrooms to establish its relevance to today's digital security issues.

However, the current literature has some major shortcomings. While Pakistani studies are mainly concerned with legal discourse analysis and case studies, the emphasis

has shifted to computational authorship attribution, multilingual forensic analysis, and AI-assisted linguistic investigation in international scholarship. Most of the local research studies focus on particular genre of legal language, for instance, FIRs, judicial judgments, banking court decisions, etc., and they do not study how forensic linguistics can be systematically incorporated into the criminal investigation procedures. In addition, there are very few empirical studies with police investigators, forensic laboratories, prosecutors, judges, and policymakers. Therefore, there is a lack of evidence on the preparedness of institutions, problems of operation and policies needed to integrate forensic linguistic expertise into the criminal justice system in Pakistan.

Another constraint is the lack of intersectoral research on forensic linguistics and digital forensics, artificial intelligence, criminology, and police investigation in Pakistan. Research on the international scene is increasingly calling for partnership solutions that bring together corpus and machine learning, discourse analysis and forensic methods to enhance the accuracy of the evidence and efficiency of the investigation. In contrast, the scholarship of Pakistan has not yet created full frameworks which can connect the linguistic evidence to the investigative process, legal process, and forensic policy. Forensic linguistic training courses, specialized courses in the university system and professional accreditation courses are few and far between, including in the country, which contributes further to the discipline's limitation in the country. The deficiencies suggest that forensic linguistics is still in its infancy even with the interest in the field among academics.

2.1. Research Gap

The literature surveyed shows that forensic linguistics has become an accepted field in the field of criminal investigations around the world, but the research within Pakistan is very limited and mainly concerned with legal discourse analysis, court language, FIRs, judicial judgments and institutional perceptions. The previous research conducted in Pakistan is useful in providing insight into certain language phenomena, but lacks in an overall assessment of the role of forensic linguistics in criminal investigations. Furthermore, very little has been done to look at the practical use of forensic linguistic tools in the investigative process, the obstacles to their use and how it is possible to take advantage of developments in digital forensics, artificial intelligence and cybercrime investigations. However, no recent study has tried to combine the latest international development (2020–2026) and emerging Pakistani evidence to assess the current state, problem and future directions of forensic linguistics in the criminal justice system. To fill this gap, the present study critically discusses recent national and international scholarship, documents the challenges in the field and proposes practical recommendations for the introduction of FL in criminal investigations in Pakistan, which contribute to the academic and criminal justice policy.

3. Methodology

3.1. Research Design

The present study used a qualitative systematic literature review (SLR) design to critically analyze the role of forensic linguistics in criminal investigation in Pakistan. The study is a synthesis of the existing national and international research to explore the current use of forensic linguistics, areas where obstacles exist in using forensic linguistics in the criminal justice system in Pakistan and opportunities for its effective use in Pakistan. For this reason, a systematic review was deemed appropriate, as it allows for the critical evaluation and synthesis of available research so as to gain a comprehensive understanding of the research problem and not have to collect primary empirical data.

3.2. Data Sources

Literature was sourced from internationally renowned academic databases such as Scopus, Web of Science, Google Scholar, ScienceDirect, SpringerLink, Taylor & Francis Online, Wiley Online Library and SAGE Journals. Articles published in the journals recognized by the HEC also have been included to add the Pakistani perspective. The keywords used in the search were forensic linguistics, criminal investigation, language as evidence, authorship attribution, legal discourse, forensic stylistics, cybercrime, courtroom discourse, digital forensics, and Pakistan.

3.3. Selection Criteria

The review was mainly devoted to peer-reviewed journal articles, book chapters, edited books and conference papers which appeared in the period 2020-2026. Theoretical underpinning for the study was provided by some of the key works of the leading scholars such as those of Coulthard, Grant, Johnson, Olsson, Solan and Tiersma, which were selectively included. Duplicate records, opinion articles, non-peer-reviewed publications and studies not related to the research objectives were excluded, but only studies that directly related to forensic linguistics and criminal investigations were included.

3.4. Data Analysis

The selected literature was analysed using thematic analysis. These studies were systematically analyzed and categorized under the following main themes: evolution of forensic linguistics, forensic linguistics in criminal investigation, authorship attribution, legal discourse, cyber and digital forensic linguistics, contributions by Pakistani linguists, institutional challenges, and future directions. The findings of national and international studies were critically analysed and compared to find common trends, problems, emerging issues and important research gaps related to the context of Pakistan.

3.5. Quality Assurance

Only real and reliable scholarly publications were included in the review to maintain validity and reliability of the review. Data from various sources in the academic databases were cross-referenced and consolidated to eliminate bias and ensure the findings

were valid. The process of the rigorous review gives a solid footing from which the current situation of FL in Pakistan can be assessed and recommendations can be made to incorporate FL in criminal investigations.

4. Data Analysis

4.1. Current Applications of Forensic Linguistics in Criminal Investigations

The use of forensic linguistics in criminal investigations has become an essential part of modern investigations as evidence that language itself can provide valuable forensic evidence. Investigators used to have a heavy reliance on physical evidence like fingerprints, DNA, ballistics and toxicology. The growing digital communication, the use of different languages and cyber-offences have however greatly broadened the reach of language in relation to its evidential function. Modern forensic linguistics involves the application of linguistic theory and analysis to written, spoken and digital texts for investigation, to determine authorship, who is being deceptive, to interpret ambiguous statements, to assess threatening communications, and to analyze witness testimony. Forensic linguistics is a relatively new interdisciplinary area which brings together applied linguistics, criminology, forensic science, corpus linguistics and computational technologies to enhance criminal investigations and judicial decision-making processes, as supported by recent international research (Wasi et al., 2024; Griffin, 2025).

The most highly developed use of forensic linguistics is in the attribution of authorship, where a text is anonymous or is disputed and the author is identified by examining the distinctive features in the text. Each individual language user has his/her own relatively stable favourites in the use of language, which can be seen as his/her language fingerprint: lexical, grammatical, stylistic and discourse preferences. These are patterns of vocabulary choice, spelling usage, punctuation usage, syntactic pattern, collocation, discourse markers, and pragmatic choices. The latest international studies show how the use of corpus linguistics together with stylometric methods and machine-learning algorithms has led to a higher level of confidence in authorship attribution in the context of criminal investigations involving ransom notes, threatening letters, extortion letters, anonymous letters, online harassment, and terrorist communications. When combined with expert linguistic interpretation, computational techniques allow investigators to process large amounts of text while achieving high classification accuracy. As a result, authorship attribution has emerged as one of the most technically advanced areas of forensic linguistics, and is now considered a valid and important tool in the process of solving crimes.

With the growth of cybercrime, the role of forensic linguistics has been given an added significance. There are now many instances of criminal activity taking place via email, WhatsApp messaging, social media, online discussion forums and encrypted messaging apps. Cybercrimes, unlike other types of crimes, may not leave a lot of physical

evidence but may result in a significant number of words. Modern forensic linguistics research demonstrates that digital communication offers investigators clues as to communicative intention, ideology, social relations, emotion, deceptive strategies, and the characteristics of the author. Recent research also shows that the combination of forensic linguistics and AI, NLP, and machine learning tools helps investigators uncover coordinated disinformation campaigns, online radicalization, cyber fraud, phishing attacks and digital impersonation more effectively than traditional investigative tools do. The technological advancements have significantly broadened the applicability of forensic linguistics in digital investigations of crimes.

Yet another area of great importance is the analysis of police interviews, witness statements and suspect interrogation. The accuracy of criminal investigations is based on the evidence itself, but also on how the information is elicited, recorded, and analyzed. The forensic linguist analyzes discourse patterns, conversational structures, question formulation, narrative organization, lexical ambiguity and pragmatic strategies to assess whether statements reflect the intent of the speaker(s) or whether there are misunderstandings, coercion or linguistic manipulation that may have affected the evidence recorded. International studies have shown that leading questions, ambiguity in the wording, translation issues, and interviewer bias can greatly influence the reliability of witness testimony and confessions. As a result, discourse analysis offers the investigator and courts useful clues to the communicative aspects of criminal investigations and helps facilitate more reliable evaluation of evidence.

Forensic linguistic analysis of legal discourse and legal documents is another close relative of investigative interviewing. Linguistic artefacts like judicial judgments, First Information Reports (FIRs), police reports, affidavits, contracts, confessional statements and legal notices all have an impact on criminal proceedings. In the field of forensic linguistics, this field helps the investigators and the legal parties to identify ambiguity, inconsistency, semantic manipulation, pragmatic inference, and discourse strategies in legal documents. Forensic linguistic analysis does not just consider grammatical accuracy, but the ways in which language contributes to legal meaning, institutional authority, evidential credibility, and judicial interpretation. This outlook has gained momentum due to the fact that textual evidence is often key in criminal cases, in addition to the physical evidence.

In the Pakistani context there has been an increasing awareness of the evidential use of language with little institutional use of forensic linguistics as there has been a limited use of the field. There has been an increasing awareness of the evidential use of language in recent times as evidenced by the research in Pakistani context, while at the same time, there is limited institutional use of forensic linguistics. First Information Reports have been analysed using a corpus-based analysis which has revealed that they have consistent

structural and linguistic features that allow them to be systematically analysed using forensic linguistic methodologies. Likewise, the forensic stylistic study of the verdicts of banking courts shows that a considerable amount of technical vocabulary, syntactic complexity and institutionalized legal expressions are commonly used, which have the potential to affect the accessibility, interpretation, and transparency of the court. The results of this study reveal that language has an evidential as well as a communicative role in the legal system in Pakistan and hence requires more serious attention from law enforcement agencies, legal practitioners and policy makers.

Recent studies in Pakistan have also pointed to the increasing importance of the field of forensic linguistics in digital investigations. Misinformation, fake news, online fraud, cyber harassment, hate speech, and identity theft are all issues that have become more common, and are causing investigative problems that are beyond the scope of traditional forensic science. Linguistic analysis of offenders' digital communications has shown that they often use unique lexicological choices, discourse strategies, ideological framing, and pragmatic manipulation to make themselves easy to identify and can be easily interpreted in the context. Hence, the value of forensic linguistic analysis for the anonymous analysis of online communication, the identification of coordinated misinformation campaigns, and the understanding of threatening digital communication has grown in Pakistan's fast-growing digital landscape.

While all these applications are developing, it can be seen that there is a significant gap in the implementation compared to the other jurisdictions developed internationally. Forensic linguists are regularly brought in to aid criminal investigations in the United Kingdom, the United States, and Australia, as well as in other nations, in cases of authorship disputes, terrorism, cybercrime, trademark infringement, witness interviews, and courtroom testimony. They have institutionalised the discipline through dedicated forensic linguistic laboratories, investigative protocols, university training programmes and expert witness accreditation systems. On the other hand, Pakistan is still on an academic discovery phase. There are significant studies and research in legal discourse, FIRs, judicial discourse and perception of the institution by the universities, but forensic linguistics has not yet become an integral part of daily investigative work. The differences suggest that there is a huge capacity in Pakistan to use forensic linguistics in practice as well as the need for institutional changes for successful integration.

The literature that has been reviewed clearly shows that forensic linguistics has grown from its linguistic specialty to a much broader field of investigation that can assist with criminal investigations in the areas of authorship attribution, discourse analysis, digital evidence interpretation, legal document analysis and cybercrime investigation. International scholarship has been able to back up the reliability and investigative value of linguistic evidence with strong empirical evidence while the Pakistani study has

established the relevance of such techniques in the local legal and investigative context. However, the utilization of forensic linguistics in Pakistan has been limited and the field is still underutilized in the criminal justice system in the country. It directly answers the first research objective by showing the current use of forensic linguistics as well as the immense potential of its wider application in Pakistan.

4.2. Challenges Hindering the Integration of Forensic Linguistics in Pakistan

Forensic linguistics, like other fields, has gained institutionalization in several developed nations, but in Pakistan, the institutional development of forensic linguistics is still in its infancy. It is the consistent finding from the reviewed literature that the problem is not the lack of linguistic evidence, but the lack of methods for the identification, analysis and use of linguistic evidence when conducting a criminal investigation. Lots of linguistic information is present in every stage of the criminal justice process, such as First Information Reports (FIRs), interviews on the police station, witness statements, confessions, judicial judgments, threatening communications, and digital interactions. However, these materials are typically not used as forensic evidence, but as documentary evidence. As a result, the investigators primarily rely on physical, biological and digital evidences, and ignore the evidential value of language. This institutional imbalance is contrary to the international practice of incorporating linguistic analysis into criminal investigations, such as cybercrime, terrorism, fraud, anonymous communications, and disputed authorship (Wasi et al., 2024; Griffin, 2025).

One of the main institutional obstacles is the lack of knowledge of forensic linguistics for police and judicial bodies. According to recent studies in Pakistan, very few police officers, prosecutors, and legal practitioners are familiar with forensic linguistics and many think of forensic science only in terms of blood analysis, fingerprints, toxicology and ballistics. Shakoor, Abid and Sarfraz (2025) identified that while the majority of the legal professionals recognised the potential of forensic linguistics, very few had received formal training in linguistic evidence and were not aware of the practical applications of linguistic evidence in investigation. This lack of awareness is also an important limitation on the use of linguistic knowledge in criminal investigation and prosecutions, since investigators are not likely to ask for linguistic analysis of evidence if they don't know that there is such a value. In contrast, certain nations (e.g., the United Kingdom, Australia) have brought forensic linguists into multidisciplinary investigative teams, enabling the use of linguistic evidence to supplement traditional investigative methods throughout the investigation and prosecution process.

Another major issue is the lack of specialist forensic linguists and professional training courses. Forensic linguistic analysis demands knowledge of linguistics, discourse analysis, pragmatics, corpus linguistics, sociolinguistics and forensic stylistics as well as legal procedures. There is hardly any provision of formal education or professional

qualification in Forensic Linguistics available in Pakistan today. Applied linguistics programmes have sections that cover such applied areas as introduction to applied linguistics, but there are very few courses, postgraduate specialisations or professional training programs that equip students with skills for working in a police department, forensic laboratory, or court. For this reason, general linguists or language teachers are frequently enlisted as investigators, with theoretical knowledge but without the more specific methodological and legal expertise needed in forensic investigations. One of the biggest challenges in the adoption of forensic linguistics in the Pakistan criminal justice system is the lack of trained specialists.

Forensic linguistics is also limited in use because of the lack of a comprehensive legal and procedural framework. International jurisdictions have over time established norms in the areas of expert testimony, authorship, forensic transcription and linguistic evidence. The frameworks offer clear guidance to investigators and courts on collection, preservation, analysis, and presentation of language evidence. However, in Pakistan, forensic linguistic evidence has not yet been recognised to the same extent. There are no specific instructions or procedures in the existing criminal procedures regarding the appointment of forensic linguists, methodological norms in linguistic analysis, or standards on the evaluation of expert linguistic testimony. This can make the use of language evidence even when it can be of great assistance in an investigation, difficult to pursue due to uncertainty around the legal status of the evidence. This procedural deficiency diminishes the systematic reality of the contribution forensic linguistics can make to the criminal investigation and judicial decision making.

Technical challenges are also a huge hurdle, especially related to digital investigations and multilingualism. Recent years have seen progress in the application of corpus linguistic software, stylometric analysis, machine learning, natural language processing and artificial intelligence in analysing huge amounts of textual and spoken data in contemporary forensic linguistics. These technologies help efficiently detect plagiarism, discourse and deceptive communication patterns. But at a larger scale, there is a lack of linguistic corpora, computational resources and language technologies particularly for Urdu and other regional languages in Pakistan. Most of the existing computational tools are limited to English and other high resource languages and are not directly applicable in the multilingual setting of Pakistan. This technological divide is limiting academic research as well as practical study of digital evidence, online fraud, cyber harassment and multilingual criminal communication.

The linguistic landscape of Pakistan is complex due to the use of various languages. Urdu, English, Punjabi, Pashto, Sindhi, Balochi, Saraiki, regional dialects are used in criminal investigations, which can occur in a single communication event. Authorship attribution, discourse interpretation and translation can be difficult due to code-switching,

code-mixing, regional variation and dialectal diversity. International scholarship is increasingly acknowledging that linguistic diversity is an analytical asset rather than a methodological problem, as multilingualism is seen as an "asset". In contrast, Pakistan does not currently have any standard forensic linguistic protocols that can now deal with multilingual evidence in a systematic manner. The creation of multilingual corpora, language-specific analytical tools, and a common set of transcription conventions, therefore, is a crucial step for institutional development in the future.

Another difficulty relates to the poor cooperation between academia and criminal justice systems. The current volume of forensic linguistic studies in Pakistan has largely been carried out in Universities and presented at academic journals. These studies have contributed greatly to our understanding of the theoretical aspects of the issue, but rarely have their conclusions affected police work, prosecution steps, or judicial actions. A gap still exists between researcher and investigator of forensic linguistic skills. The work of all these institutions is the hallmark of effective forensic linguistics, and sustained collaboration among them is a requirement for it to be effective. International experience shows that the effective practice of forensic linguistics requires the sustained collaboration of these institutions, universities, police departments, prosecutors, and courts. This cooperation between disciplines enables the transfer of knowledge, professional training, the development of methodology and the implementation in practice. There is a lack of similar collaborations in Pakistan which significantly restricts the application of academic research in investigative practice.

Limited resources also impact the development of forensic linguistics. The creation of specialized forensic linguistic units involves professional training, digital infrastructure, corpus creation, analytical software, recruiting experts, and ongoing research. Forensic linguistics has not been accorded much significance compared to other forensic sciences like ballistics, DNA profiling or digital forensics within the Pakistan criminal justice system. As detailed in the reviewed literature, it is clear that these traditional forensic disciplines are still very crucial, but that linguistic evidence should be treated as an adjunct to other forensic methods instead of a competitor. A more viable and affordable approach to the integration of forensic linguistics into existing forensic science institutes may, therefore, be to develop new institutional structures as opposed to integrating the field into existing institutes.

The other problem that has arisen in the literature is that there are very few empirical forensic linguistic studies conducted in real cases of crime in Pakistan. The majority of published research focuses on the analysis of legal text, judicial decisions, FIRs or institutional perceptions, but not the study of the actual files of investigation or the use of language in courtrooms. Undoubtedly, this limitation is also due to ethical restrictions, confidentiality concerns and restricted access to police records. However, there is a lack

of empirical research on case studies to test the effectiveness of forensic linguistic methods in the criminal justice system in Pakistan. In contrast, there are many documented examples of the role forensic linguistics can play in investigation of criminal cases across the globe, but much less in Pakistan.

These findings collectively indicate that the problems of forensic linguistics in Pakistan are not only technical, but institutional, educational, legal, and policy based as well. The literature unanimously shows that Pakistan has linguistic diversity, expertise in academics, and investigative need for the development of forensic linguistics. Lack of institutional recognition, specialized training, uniform legal structures, technological support, interdisciplinary cooperation, and application in practice, however, still hinder its use in criminal investigations. University, law enforcement, forensic science institutions, judicial and policy makers will need to work together to resolve these complex issues. Forensic linguistics, which is essential to become routine practice in evidence-based criminal investigation in Pakistan, requires such reforms.

4.3. Emerging Opportunities and Future Directions for Forensic Linguistics in Pakistan

Even though various challenges have been discussed in the above section, the literature studied revealed that Pakistan has a great potential to introduce the Forensic Linguistics as a tool in the Criminal Justice System. There is a growing digitization of communication, a rise in crime involving communication systems and cyber-enabled crimes, expansion of forensic science infrastructure, and increased academic interest in forensic linguistics, all of which provide favorable conditions for the development of forensic linguistics. In the new internationalized world, forensic linguistics is not considered a kind of 'little sister' of the other scientific specialties, but rather an integral part of evidence-based criminal investigation alongside other forensic sciences. Therefore, Pakistan has a chance to take advantage of recent technical advancements, institutional changes as well as inter-disciplinary cooperation to bolster the importance of linguistic evidence in crime solving.

An exciting potential application is the use of Artificial Intelligence (AI), Machine Learning (ML), NLP, and corpus linguistics in forensic investigations. Computational methods have been found to be effective in processing vast quantities of text with high levels of accuracy, and to enhance the efficiency and accuracy of authorship attribution, deception detection, hate speech detection, cybercrime analysis, and digital evidence examination in international studies. These technologies do not compete with forensic linguists; they complement them and help to achieve greater precision in the analysis, uncovering patterns in lexical, syntactic, semantic and stylistic usage that might not be easily discerned by other means. Investing in multilingual linguistic corpora, computational forensic tools and AI-powered analytical systems that can process Urdu and

regional languages will significantly boost investigative capabilities for Pakistan, especially in the fight against cyber fraud, on-line radicalisation, digital harassment, financial crimes and anonymous communications.

An additional key opportunity relates to the institutionalisation of forensic linguistics in law enforcement and forensic science bodies. Multidisciplinary cooperation between the police investigators, forensic scientists, linguists, prosecutors and judiciary is essential to the success of this implementation as seen from the international experiences. Pakistan has already developed forensic institutions like Punjab Forensic Science Agency (PFSA) and Provincial Forensic Labs, which can integrate forensic linguistic skills into their operations. The use of trained forensic linguists in existing forensic and investigative units would be a viable and cost-effective approach rather than creating brand new institutes. This would allow investigators to examine linguistic evidence in conjunction with biological, digital and physical evidence and enhance the fullness and certainty of criminal investigations.

The literature reviewed also emphasizes the critical need to strengthen capacity through higher education and professional training. For the time being, forensic linguistics is barely incorporated in limited number of applied language programmes in Pakistan, while opportunities for specialization in postgraduate education are scarce. A course on authorship attribution, a course on forensic stylistics, a course on forensic discourse analysis, a course on legal language, a course on forensic phonetics, a course on computational linguistics, a course on corpus linguistics and a course on expert witness practice should therefore be introduced in universities at undergraduate and postgraduate levels. Coordinated training programmes between universities, police academies, judicial academies and forensic science institutions will further improve the professional competence and aid in the transfer of knowledge between the academic and criminal justice communities. The development of a new cadre of well-trained forensic linguists is critical for the sustainability of the field in the long-term.

Another potential is the creation of an integrated framework of laws and policies for the use of linguistic evidence in criminal investigations. Available literature clearly indicates that lack of uniformity in the investigative process and clear guidelines on evidence are significant hurdles in the practical implementation of forensic linguistics in Pakistan. Policymakers need then to establish legal guidelines for the collection, preservation, interpretation, and admissibility of linguistic evidence in criminal trials. It would be helpful to create professional accreditation systems for forensic linguists and to create guidelines for the conduct of expert testimony in order to improve the credibility and acceptance of linguistic evidence in court. The changes would give investigators and courts more confidence in forensic linguistic services and methodological uniformity, and ensure procedural fairness.

The multilingual linguistic scenario in Pakistan must also be seen as an opportunity instead of the methodological difficulty. The linguistic diversity of the country, ranging from Urdu and English to Punjabi, Pashto, Sindhi, Saraiki, Balochi and many other regional dialects creates an ideal setting for the implementation of new forensic linguistic methodologies that are multilingual. The high linguistic diversity of the country, such as Urdu, English, Punjabi, Pashto, Sindhi, Saraiki, Balochi, and many other regional dialects present an ideal environment for developing innovative multilingual forensic linguistic methodologies. Development of multilingual forensic corpora and language-specific stylometric models, standard transcription conventions and computational resources for Pakistani languages should be given importance in future studies. This would help immensely in the study of cases related to code-switching, dialect variation, translation conflicts, and multilingual communication in digital contexts. Furthermore, the multilingual forensic linguistic resources that are created in Pakistan can help in advancing international research on forensic investigations in linguistically diverse societies.

As cybercrime and digital communication continues to grow, the importance of forensic linguistics in the Pakistani criminal justice system keeps increasing. Online fraud, phishing, identity theft, cyber harassment, misinformation campaigns and extremist propaganda, financial cybercrime all increasingly provide investigative techniques that will need to be able to analyse language based evidence across multiple online platforms. New international studies have shown the value of linguistic analysis for determining communicative intention, ideological orientation, deception strategies and authorship attributes embedded in electronic communication, in addition to digital forensics. This is an appropriate time for Pakistan to introduce the forensic linguistic skills in digital investigations due to the increasing investment in the units of cybercrime investigation, which will enhance the efficiency of the investigations and its evidence interpretation.

The literature reviewed also highlights the need for collaboration among disciplines to promote the advancement of forensic linguistics. There is a growing need for the cooperation among linguists, criminologists, psychologists, computer scientists, forensic experts, legal practitioners, and policymakers for effective criminal investigations. It is, therefore, recommended that future research in Pakistan should be based on interdisciplinary approaches which involve the use of corpus linguistics, computational linguistics, artificial intelligence, forensic psychology, digital forensics, and related fields of criminology. The cooperation would create a space for methodological developments, strengthen the analysis process and lead to the creation of investigative practices based on evidence, which could meet the challenges of more complex types of criminal acts. A vital aspect of the process of turning research into practice is the strengthening of partnerships between universities, forensic laboratories and law enforcement agencies.

There are also substantial opportunities for future empirical study that are identified in the literature. The existing Pakistani studies have been focussed on legal discourse, judicial language, FIRs, and institutional perceptions, missing out many aspects of investigation. Future research should focus on authentic criminal case files, anonymous communication, threatening letters, ransom notes, online fraud, cybercrime investigations, police interaction, courtroom interaction and multilingual evidence in both qualitative and quantitative forensic linguistic approaches. Comparative study of investigative practices of Pakistan and international practices would further help in understanding the best practices and would also help in developing context specific forensic linguistic models appropriate to the legal and sociolinguistic context in Pakistan.

The literature reviewed indicated that the future of forensic linguistics in Pakistan is not only dependent on technological developments, but also on institutional commitment, educational reform, and inter-disciplinary collaboration, and supportive legal frameworks. While the discipline is still underutilized, it has a solid foundation for future development due to the complexity of criminal investigations, the rapid growth of digital communication, and the recognition of language as a forensic tool. Pakistan can significantly improve the accuracy, efficiency, and transparency of investigative processes by incorporating forensic linguistics into the investigative process, improving academic and professional training, investing in the computational tools, and creating standardized legal procedures.

5. Discussion

The current study investigated the status of forensic linguistics in criminal investigation in Pakistan by analysing the latest available literature from the Pakistani national and international context from 2020 to 2026. The results show that forensic linguistics has become an important interdisciplinary discipline that plays a vital role in the investigation of crime in the areas of authorship analysis, legal discourse analysis, forensic stylistics, investigative interviewing, cybercrime analysis and interpretation of digital evidence. This is in line with the latest international research, which has acknowledged the significance of language as a valuable tool for criminal investigations, alongside standard forensic methods like DNA profiling, fingerprinting, and digital forensic analysis (Wasi et al., 2024; Griffin, 2025). The literature reviewed also shows that forensic linguistics has benefited from developments in AI, corpus linguistics, machine learning, and natural language processing, especially in the field of anonymous communication, cyber fraud, online harassment, and digital misinformation.

One of the key findings of the study is that forensic linguistics has been institutionalized with increasing intensity in the western countries but it is not yet being implemented in Pakistan. Linguistic evidence (such as FIRs, witness statements, police interviews, judicial judgements, and electronic communications) in cases of crime is not

routinely analysed in a forensic linguistics manner. The findings of this observation align with the results of Anjum and Anwar (2023) who found that Pakistani legal discourse is linguistic complex and demand specialized analysis, and Zaman et al. (2023) who found that FIR is a genre of its own and has identifiable linguistic patterns. In the same vein, Shakoor et al. (2025) reported that while legal professionals and police officers recognized the usefulness of forensic linguistics, they lacked institutional awareness and expertise in its application. Together, these studies strengthen the current result that Pakistan has done a great job of laying the academic foundation for FL and is yet to utilize the knowledge acquired in the field of investigation in a regular fashion.

This study also revealed some interconnected obstacles for the integration of FL in Pakistan's criminal justice system. The most common problems reported were institutional restrictions, professional limitations, lack of specialised forensic linguists, lack of legal recognition of linguistic evidence, lack of technological facilities, and lack of collaboration between the law enforcement and the university. The results are similar to those of international studies that highlight the need for expertise in the field of forensic linguistics but also the support of the institution, standardisation of investigative procedures and multidisciplinary cooperation for the implementation of successful forensic linguistic applications. From this comparison it seems that the role of institution building was more important than the linguistic theory in making it a more effective tool in contributing to the practical implementation of forensic linguistic evidence in Pakistan vis-à-vis the countries where Forensic Linguistics is well established.

An additional interesting discovery is the increasing importance of Forensic Linguistics in the cybercrime and digital communication landscape. The growing use of social media, encrypted messaging apps, online fraud, misinformation, identity theft, and cyber harassment has led to a transformation in how language is becoming a major source of digital evidence that can be reviewed, according to the aforementioned studies. In recent years, some international research programs have called for incorporating the field of forensic linguistics in the area of artificial intelligence, machine learning and natural language processing in order to enhance the issues of authorship attribution, deception detection or online threat assessment. The current study review indicates that there is tremendous potential for Pakistan in these technological advancements as traditional methods of investigation are not effective enough to analyse complex multi-linguistic digital communication. The combination of computational forensic linguistic techniques with the current digital forensic capabilities would thus significantly add to the investigations in cybercrime in the country.

The results also show the need for increased role of higher education and interdisciplinary cooperation to promote forensic linguistics in Pakistan. Empowered collaborations between universities and forensic laboratories, as well as between the police

and legal and judicial bodies are consistently shown to be beneficial in countries where forensic linguistic practices are well developed. On the other hand, the research in Pakistan, is mostly of an academic nature and there is not much interaction between researchers and practitioners in the justice system. This divide makes it less easy to apply research into practice and hinders institutionalisation of forensic linguistics. Thus, it would be beneficial to integrate specific academic courses, professional qualification and joint research projects to help build the knowledge base needed for forensic linguistics use in practical cases of criminal investigation.

The current research is also pertinent to literature in that it fills an important gap in the research. Past Pakistani research on law has primarily centered on particular components of legal discourse, courtroom language, judicial opinions and institutional perceptions. There have been few studies that have comprehensively synthesized the current role of forensic linguistics in criminal investigations and simultaneously discussed the challenges, opportunities and future directions. The current research not only presents the state of the art in the international field but also incorporates new ideas and concepts in Pakistan based on the latest international research, providing a more comprehensive perspective on the perspectives of the discipline in Pakistan's criminal justice system. It shows that forensic linguistics is not just an academic discipline but a tool for effective investigation work, which can help in the effective interpretation of evidence, investigative accuracy and judicial decision making.

In general, it seems that forensic linguistics offers a great possibility to enhance criminal investigations in Pakistan. But to achieve this potential, several institutional reform strategies are needed, as well as more coordinated efforts between the academic world and criminal justice institutions, and professional training and investment in multilingual computational tools to support language evidence. These would enable the systematic incorporation of FL in investigation and help build the efficient, transparent and evidence-based criminal justice system.

6. Conclusion

This study critically analyzed the forensic linguistics application in criminal investigation in Pakistan through a synthesis of the latest literature found in Pakistan and abroad from 2020 to 2026. The review shows that forensic linguistics has become a valuable interdisciplinary subject that boosts crime investigations through authorship attribution, discourse analysis, forensic stylistics, legal document examination, investigative interviewing and cybercrime analysis. The international evidence shows that language is now playing an important role in forensic analysis, and that it is being accepted as a valid empirical source for forensic cases and evidence alongside traditional forensic methods.

The results indicate that forensic linguistics is not being put into practice in Pakistan although the academic studies are gaining momentum. Some institutional barriers, lack of specialized forensic linguists, lack of linguistic evidence in the legal process, poor technological support, and weak cooperation between academia and law enforcement agencies are still posing challenges to its successful incorporation into criminal investigations. However, the recent Pakistani research shows that there is an emerging interest in this field and indicates that there is a scope to enhance the legal interpretation, investigative precision and computer forensics investigation.

The study also found that these emerging technologies are transforming the field of forensic linguistics in Pakistan, and it is essential to harness their potential to further the practice of forensic linguistics. For this to come to fruition, there is a need for coordinated action to be taken for the creation of specialised academic programmes, the creation of multilingual forensic linguistic resources, developing institutional partnerships, formulating of standardised legal guidelines and embedding of forensic linguistic expertise within police, forensic science and judicial institutions. These priorities can help Pakistan improve the quality, transparency and reliability of criminal investigations, and move toward an evidence-based and efficient criminal justice system. So the study is of great value for future research, policy formulation and institutionalization of forensic linguistics in Pakistan.

7. Recommendations

- a) Integration of Forensic Linguistics in Law Enforcement and Forensic Science Institutions: Pakistan's law enforcement agencies and forensic science institutions should make an effort to incorporate forensic linguistics into the process of criminal investigation by forming forensic linguistic units and recruiting trained forensic linguistic experts to participate in the different aspects of investigation which involve authorship issues, cybercrime, anonymous communication and legal document analysis.
- b) Capacity Building and Professional Training: Universities, police academies, or judicial training institutes should establish professional certification courses, regular forensic coursework, and regular professional training in forensic linguistics to cultivate qualified and specialized experts who can assist in criminal investigations and judicial proceedings.
- c) There is a need to create uniform legal guidelines and investigating procedures for the use of linguistic evidence in a consistent and efficient manner by the Government of Pakistan.
- d) It is recommended that multilingual forensic linguistic corpora for Pakistani languages are developed in the future, and to integrate with the use of artificial

intelligence, machine learning, and natural language processing in forensic linguistic investigations to improve the analysis of digital evidence and cybercrime.

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