

The Challenges of Crime and Criminal Tracking Networking and System (CCTNS) in Policing

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Abstract

The Crime and Criminal Tracking Network and Systems (CCTNS) is a digital policing initiative enhancing crime reporting, investigation, and data management in India. This study assesses its implementation in Sagar City, Madhya Pradesh, highlighting its benefits in streamlining law enforcement while identifying challenges such as software issues, inadequate training, and infrastructure gaps. Key recommendations include improved system usability, cybersecurity measures, and better training. Addressing these concerns will enhance CCTNS's efficiency, ensuring a more transparent and technology-driven criminal justice system.

Keywords: Digital Policing, Law Enforcement, Crime Investigation, ICT, Cybersecurity, Police Modernization

Introduction

The modern world is complex and sophisticated, with advancements in technology and communication facilities. Law enforcement agencies play a crucial role in maintaining law and order, detecting and preventing crime, and protecting citizens from criminal activities. However, traditional policing techniques are insufficient to combat crime, and advanced technology like artificial intelligence, biometric analysis, data analytics, and surveillance systems can supplement existing capabilities. To combat this, India has developed advanced protocols for crime detection and prevention. The Crime and Criminal Tracking Network and Systems (CCTNS) is an indispensable tool for contemporary law enforcement, improving efficiency, transparency, and cooperation among law enforcement organizations. Through the provision of a centralized database, CCTNS facilitates the easy exchange of information on crimes and offenders, leading to expedited investigations and improved offender tracking. Furthermore, it facilitates data-driven decision-making, real-time monitoring, and increased accountability, contributing to a more efficient and citizen-friendly policing system and improved public service delivery.

The CCTNS Project

The Crime and Criminal Tracking Network & Systems (CCTNS) is a comprehensive and integrated platform developed by the Government of India to enhance the efficiency and effectiveness of policing through the adoption of Information and Communication Technology (ICT). Launched under the National e-Governance Plan, it aims to create a nationwide network infrastructure for IT-enabled tracking systems for crime investigation and detection. The scheme was approved by the Cabinet Committee on Economic Affairs (CCEA) and launched on 19th June 2009. The scope of CCTNS spans across all 36 States includes Union Territories and covers all Police Stations (14,000+ in number) and all higher police offices (6,000+ in

numbers) in the country. CCTNS has been conceptualizing on the principle of centralized planning and decentralized implementation at States/UTs. (Indian Institute Of Public Administration(IIPA), 2013).

The Crime and Criminal Tracking Network & Systems (CCTNS) project, initiated by the Ministry of Home Affairs (MHA) in 2009, is an extension of the Common Integrated Police Application (CIPA) project, which began in 2004. While CIPA focused on computerizing police station data independently, CCTNS interconnects all police stations and higher police offices nationwide, facilitating real-time information sharing on crime and criminals. The National Crime Records Bureau (NCRB) oversees the program, with states and Union Territories responsible for implementation. CCTNS enhances law enforcement effectiveness by creating a unified database for crime tracking and investigation. By digitizing records and automating routine processes such as filing First Information Reports (FIRs) and documenting investigations, CCTNS reduces the manual burden on police personnel, minimizes errors, and accelerates the pace of justice delivery. It empowers citizens through online complaint registration and case tracking, fostering transparency and trust. The system's analytical tools aid in identifying crime patterns, supporting data-driven decision-making and efficient resource allocation. Despite challenges like infrastructure and training, CCTNS represents a transformative shift toward a more organized, transparent, and accountable policing system, promising improved public safety and inter-state collaboration.

Goal of the CCTNS Project

With the use of cutting-edge technology CCTNS seeks to transforming Indian law enforcement and increasing productivity. It aims to simplify police operations and administrative procedures, improve resource management, and encourage responsibility and openness within the police. The CCTNS aims to compile a national database of crimes and offenders, offer online portals for reporting complaints, and monitor case statuses. It also seeks to improve citizen services and accountability in police operations. The key objectives of the CCTNS include providing enhanced tools for investigation, crime prevention, and law enforcement, increasing operational efficiency by reducing manual processes, creating platforms for sharing crime and criminal information, and ensuring improved service delivery to the public. At the micro-level, the CCTNS aims to enhance police functioning, facilitate faster investigation, facilitate data collection and sharing, assist senior police officers in better supervision, track crime and criminal investigation progress, and reduce manual record-keeping.

The Crime and Criminal Tracking Network and Systems (CCTNS) offer numerous advantages and benefits in the realm of law enforcement and public safety. By creating an integrated database CCTNS facilitates seamless information sharing across police stations and agencies. This system provides real-time access to critical data, aiding in the swift identification and tracking of criminals and improving the accuracy and reliability of criminal records, thus reducing data manipulation and errors. CCTNS enhances transparency and accountability within the police force, promoting better governance and public trust. For citizens, it streamlines processes such as filing complaints, accessing FIRs, and obtaining clearances, making interactions with law enforcement more efficient. Key benefits to the police department include improved investigative tools, better crime pattern analysis, reduced manual work, and

enhanced coordination. The Ministry of Home Affairs (NCRB) benefits from standardized data capturing and nationwide access to crime data, improving trend analysis and crime prevention efforts. Citizens benefit from simplified processes and improved service access, while external departments benefit from seamless integration and information exchange with police systems. Overall, CCTNS modernizes policing and fosters a safer and more secure environment.

Interoperable Criminal Justice System (ICJS)

The Cabinet Committee on Economic Affairs (CCEA) approved the extension of the Crime and Criminals Tracking Network and Systems (CCTNS) Project by the Ministry of Home Affairs. The government plans to implement the Interoperable Criminal Justice System (ICJS) in 2017, integrating CCTNS with E-Courts, e-prisons, forensics, and prosecution. The project will be completed by March 2018. The ICJS will include a Citizen Portal with interfaces to various e-Government projects, including Aadhaar, the National Population Register, Vahan Project, and the National Emergency Response System Project. The project will cost Rs. 2000 crore, including an extra five years of operation and maintenance. It will result in a central citizen portal with links to state-level citizen portals, providing citizen-friendly services such as police verification, crime reporting, and access to legal services. The project will also enable national-level crime analytics to be published more frequently, aiding policymakers and lawmakers in taking appropriate action. (Ministry of Electronics and Information Technology, 2018).

Statement of the Problem

The Crime and Criminal Tracking Network (CCTNS) aims to modernize the police system by integrating technology and ICT. However, the system faces challenges include technological limitations, resistance to change, inadequate training, infrastructural deficiencies, and cyber security threats. These issues hinder network availability, connectivity, and the successful deployment of CCTNS, undermining its potential for crime management.

This paper addressing the significant hurdles faced in the implementation and utilization of the Crime and Criminal Tracking Network & Systems (CCTNS) within the police force. The problem is recognizing and evaluating these obstacles in order to develop workable plans for resolving them, which would allow the CCTNS to achieve its goal of revolutionizing Indian policing. The presented study is focusing on the issues and challenges of CCTNS and its operators and related staffs of police stations in Sagar City, Madhya Pradesh. The study analysing and interpreting the various issues and challenges behind the working of CCTNS in police stations and suggesting some methods to improve the project for enacting and implementing transparent and flawless criminal Justice system within the country.

Review of literature

Gulzar and Singh (2019) conducted a study on ‘The role of CCTNS in controlling crime’ in Haryana state. The study explores and identifying the impact and effect of CCTNS in controlling crime through recording and reporting of online FIR in the greatest number of cases even in petty crimes. The study shows the data of reported crime in Haryana before and after the application of CCTNS in policing and it clearly shows that, an increase number of reported

crimes are seen after the enactment of CCTNS. The study also analyses the advantages of smart policing and the use of ICT in controlling crimes. The study observed that it has been noted the use of ICT and "Smart Policing" programs enable taxpayers to file a formal complaint online and the incidents that had previously gone unreported became known.

Dhir and Sarraf (2015) present the paper on the implementation of the Crime and Criminal Tracking Network and System (CCTNS) project using agile methodology, which benefits both the organization and the customer. The project aims to assist citizens with FIRs, criminal complaints, and other services. To save time, e-forms were created for offline completion, improving performance and speed. Agile methodology yields higher-quality results, addresses client erratic needs, and allows for greater project development flexibility in an exponentially changing business environment. The study also demonstrates the workings of agile methodology in the CCTNS project and analyses its workings. This approach is advantageous for both the organization and the customer.

Renushe et al. (2012) emphasize the importance of data mining technology in designing proactive services to reduce crime within police jurisdictions. They introduce the Crime and Criminal Tracking Network and Systems (CCTNS) project, which aims to connect police units at various levels across states to the National Crime Records Bureau (NCRB) for enhanced crime investigation and detection. Additionally, the authors discuss various data mining methods and techniques for smart policing using ICT, including systems like the Crime Criminal Information System (CCIS), Organized Crime Intelligence System (OCIS), and Common Integrated Police Application (CIPA).

Hickok and Xynou (2015) examine security, surveillance, and data-sharing schemes in India, particularly after the 2008 Mumbai terrorist attacks. They discuss the implementation of the National Intelligence Grid (NATGRID) and the Crime and Criminal Tracking Network & Systems (CCTNS), as well as surveillance systems like the Lawful Intercept and Monitoring (LIM) system, NETRA, and the Central Monitoring System (CMS). The paper highlights the CCTNS's goal of modernizing the police force and enhancing citizen services by connecting police stations and central organizations. It emphasizes the need for policy recommendations to protect privacy and human rights while addressing the legal and ethical considerations of these initiatives.

Gupta et al. (2014) propose a comprehensive framework for an Intelligent Police System (IPS) designed to meet the evolving responsibilities of Indian law enforcement by providing a multi-level decision support system with advanced analytical methods like data mining and crime analysis. The study highlights the importance of handling large volumes of crime data through techniques such as clustering, classification, and association rule mining to improve crime detection, criminal profiling, and trend prediction. The authors emphasize the need for integrated systems like the Crime Criminal Information System (CCIS), Common Integrated Police Application (CIPA), and the Crime and Criminal Tracking Network System (CCTNS) to enhance policing efficiency and modernize law enforcement.

Mehta et al. (2024) discuss the potential of block chain technology to enhance India's First Information Report (FIR) system, which is often manually written despite online platforms.

The existing Crime and Criminal Tracking Network and Systems (CCTNS) is state-specific and centralized, necessitating a decentralized system. The proposed block chain-based system utilizes hashing, encryption, and IPFS storage to secure police reports and timestamps.

Sahu (2023) examines the role of the Crime and Criminal Tracking Network and System (CCTNS) in controlling cybercrime, highlighting its potential to modernize the police system. CCTNS provides a centralized database for criminal records, enables quick identification of suspects, and supports the prosecution of cybercriminals with electronic evidence. The system is expected to significantly impact the prevention and control of cybercrime in India through real-time information sharing and investigation.

Rajput and Bhardwaj (2017) conducted a sociological study on the effectiveness of the Crime and Criminal Tracking Network and System (CCTNS) in Sagar district, Madhya Pradesh, finding it beneficial for police in enhancing transparency, reliability, and efficiency. The study highlights CCTNS's role in improving crime investigation and control, and its usefulness in policy-making and research. However, it also identifies areas for improvement, including network problems and the need for longer training periods for police personnel.

Agarwal et al. (2016) propose an enhancement to the existing Crime and Criminal Tracking Network System (CCTNS), introducing an online solution for crime reporting and tracking to integrate with "Smart City" and "Digital India" initiatives. The system features a dual portal for citizens and administrators, enabling electronic FIR filing, GPS tracking, and multimedia evidence collection, while improving communication and reducing manual work. The study highlights the potential for proactive policing, increased transparency, and integration with other government services, despite initial challenges in police training and citizen involvement.

Narayan (2023) examines the challenges of smart policing initiatives in India, focusing on the Crime and Criminal Tracking Network System (CCTNS), which has faced delays and limited success due to technical, bureaucratic, and political issues. Despite its goal of digitizing crime data and providing citizen services, the system is underutilized, often operated by specially trained constables instead of police officers. The study highlights issues such as lack of integration with the Crime Mapping and Predictive Analysis System (CMAPS), political resistance, bureaucratic hurdles, and mismanagement of funds, suggesting that addressing these infrastructural challenges is essential for successful implementation.

Methodology

This chapter is intended to provide a clear description of the study methodology to be used. Methodology is a systematic and scientific description of how a study has been carried out. Methodology is defined as the study by which we gain knowledge. This chapter details the method, purpose of the study, significance of the study, coverage of the study, sampling technique, data collection and process of data collection.

Objectives

- To study the work function and effectiveness of CCTNS
- To analyze the problems, challenges and technical issues in implementation of CCTNS

- To identify the problems and difficulties faced by the police staffs in operating of CCTNS
- To suggest and recommend various measures for the effective operation of the project.

Research Design

For this study, the researcher uses descriptive research method to describe the topic as a whole and to find out the problems issues and other loopholes through previous studies and responses from the samples. This type of research methodology is most suitable to analysing the existing facts and thereby to find out gap behind the study.

Universe

The universe of the study was decided as all the Police stations in Sagar city, Madhya Pradesh.

Sample, Sampling technique and Size

The study's respondents include all police staff in Sagar city, focusing on CCTNS operators, related support staff, and supervising officers. In this research, the researcher used purposive sampling to gather accurate, in-depth information about a specific occurrence with a sufficiently large sample size. The study was to be conducted with a sample size of 32, limited by the small number of CCTNS operators and allied staff. Data were collected from CCTNS operators, supportive police staff, and supervisory officers such as Sub Inspectors and assistant sub inspectors

Tool for data collection

The data was collected through police station visit. A pre prepared interview schedule containing a series of questions was used for the collection of data from the samples.

Procedure for data collection

The data for this study was collected through field survey, visiting police stations, interviewing staffs. An interview schedule is prepared for the collection of data and for asking related questions and statements. The permission for police station visit was granted from Superintendent of Police; Sagar City and the request was moved through the department head.

Data processing

All the items in the respective tools were assigned codes and then data was entered in the Statistical Package for Social Sciences (SPSS).

Data analysis

The Quantitative data was analysed using statistical methods through the Statistical Package for Social Sciences (SPSS), and with the help of Microsoft excel. The results are presented in report in the form of tables, bar graphs and pie charts. Graphs are made with the help of Microsoft excel.

Result and Discussion

Table 4.1 Basic demographic details of the respondents

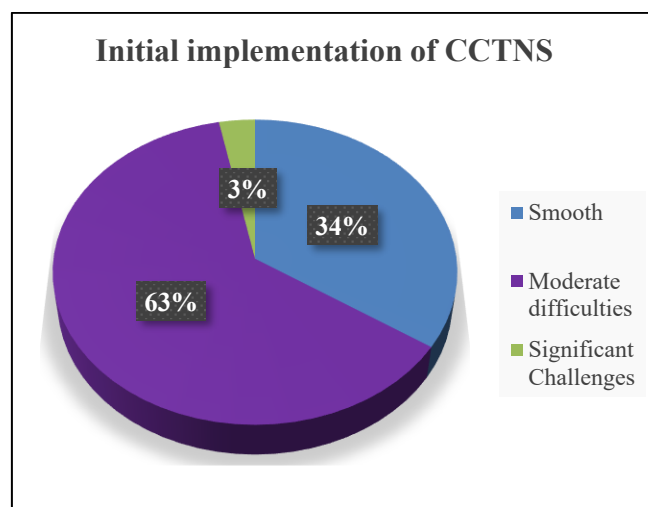
Frequency		Percent
1.Gender		
Male	19	59.4
Female	13	49.6
Total	32	100
2.Age of the respondents		
28-34 years	1	3.1
35-40 years	19	59.4
41-46 years	8	25.0
47-52 years	4	12.5
Total	32	100
3. Literacy level of the respondents		
Plus two	7	21.9
Graduation	23	71.9
Post Graduation	2	6.3
Total	32	100
4.Rank of the police staffs		
Constable	18	56.3
Head constable	5	15.6
ASI	3	9.4
Sub Inspector	6	18.8
Total	32	100
5.Years of services of the staffs		
0-10 years	7	21.9
10-20 years	21	65.6
20-30 years	3	9.4
30-40 years	1	3.1

Total	32	100
6.Working hours of police staffs		
0-10 hours	10	31.3
10-20 hours	14	43.8
20-30 hours	8	25.0
Total	32	100

The researcher studied and collected data from the operators of CCTNS in each police station in Sagar City and from allied staff who are support and supervise the operation of CCTNS.

Table (3.1) shows the analysed data of the respondents showing the basic demographic details of the police staffs. From the respondent's gender overview 59.4% of the responders are male and 49.6% of them are female. It shows that somewhat equal percentage of men and women police are recruited for the operators of CCTNS. From the age data a higher percentage of the respondents are in the age group in between 35 – 40 years of age. 25% of them are included in the age group in between 41-46 and a few percentages of them are included in the rest age categories. When analysing the literacy status of the respondents it shows that most of them are graduated (71.9%). A few of them are literate with post-graduation and plus two qualifications. For this study 56.3% of the staffs are constables, 15.6% of them are head constables, 18.8% of them are Sub Inspectors and rest few of them are assistant sub inspectors. The service year data shows that the staffs are mostly having service years in between 10-20 years (65.6%), and 21.9% of them are having service years of less than 10 years, and also from the analyzed data most of the operators and allied staffs are working under the police stations for 10- 20 hours (43.8%).

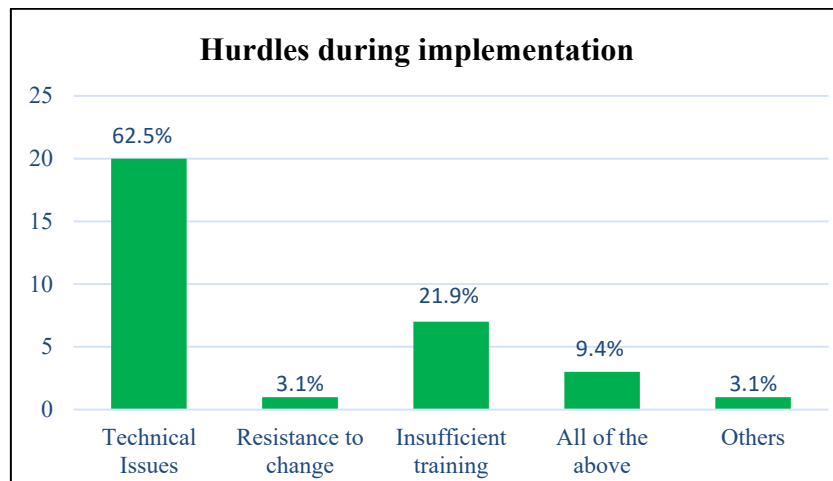
Figure 4.1 Initial implementation of CCTNS



From the figure 4.1, the analyzed data shows that most of the responses show that CCTNS had moderate difficulties in its initial implementation (63%). 34% of the responded data shows that

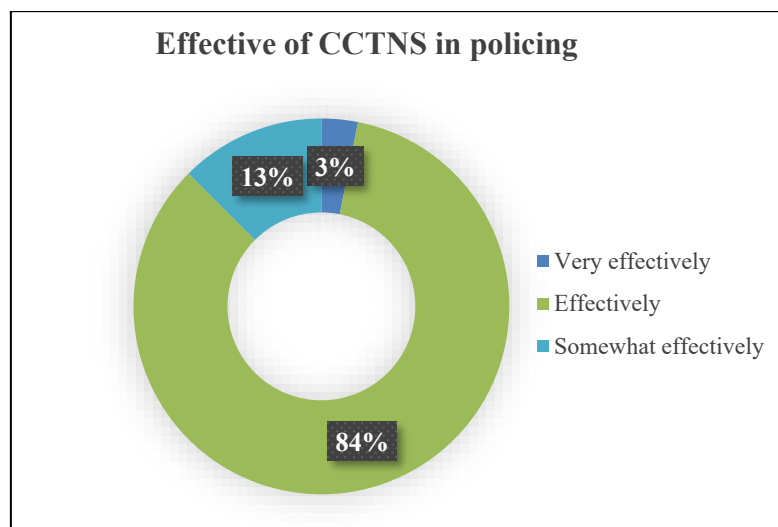
the system is smooth to operate. From the overall data it can be analyzed that CCTNS face some difficulties within its implementation stage.

Figure 4.2 Hurdles during implementation



From the figure 4.2, an average of 63% of the total responses shows that there are certain technical issues while operating CCTNS and about 22% of the respondents points out the insufficient training to the staffs to operate CCTNS smoothly. Thus, the result said that there are some hurdles mainly having technical issues in its implementation time.

Figure 4.3 Effective of CCTNS in Policing



As illustrated in the figure (4.3) the responses indicates that CCTNS is effective in policing and its functioning as that an approximate of 90% of the responses responded that CCTNS is effective or somewhat effective for policing and its procedures.

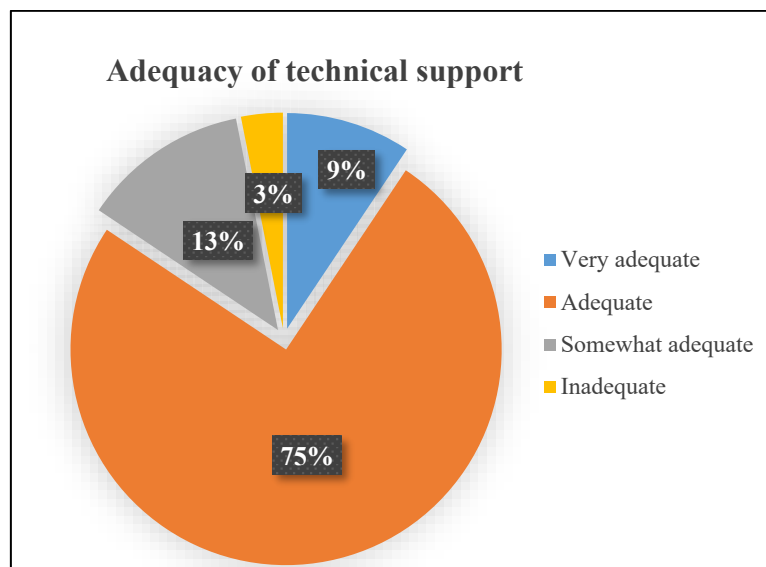
Table 4.2 Compatibility of CCTNS

Problems	Frequency	Percent
Software incompatibility	20	62.5

Hardware issues	4	12.5
Data format discrepancies	1	3.1
No major issues	7	21.9
Total	32	100.0

The table (4.2) depicts that there has some software incompatibility within the CCTNS having responses of approximately 63% with this view and about 23% responses clearly indicate the existences of hardware issues to the project. So, it can be finalized as per the data that CCTNS facing various incompatibilities within its operations.

Figure 4.4 Adequacy of technical support



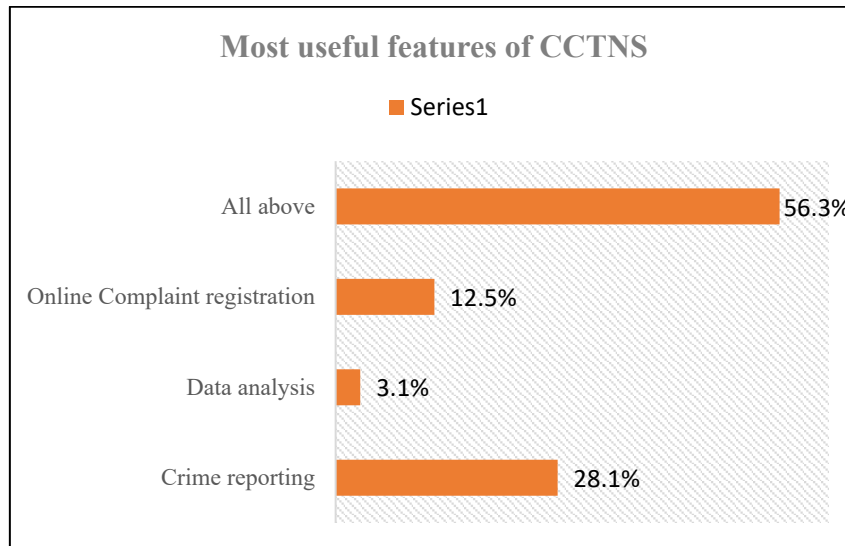
The figure (4.4), showing the response of the respondents in the matter of technical supports in the initial stages of implementation of CCTNS. From the data from the samples depicted here, it can be inferred that 75% of the responses are mentioning that CCTNS got adequate technical support and only 3% of the response shows its negative side.

Table 4.3 Usability complaints of CCTNS

Complaints occurrences	Frequency	Percent
Frequently	4	12.5
Yes, Occasionally	27	84.4
Never	1	3.1
Total	32	100.0

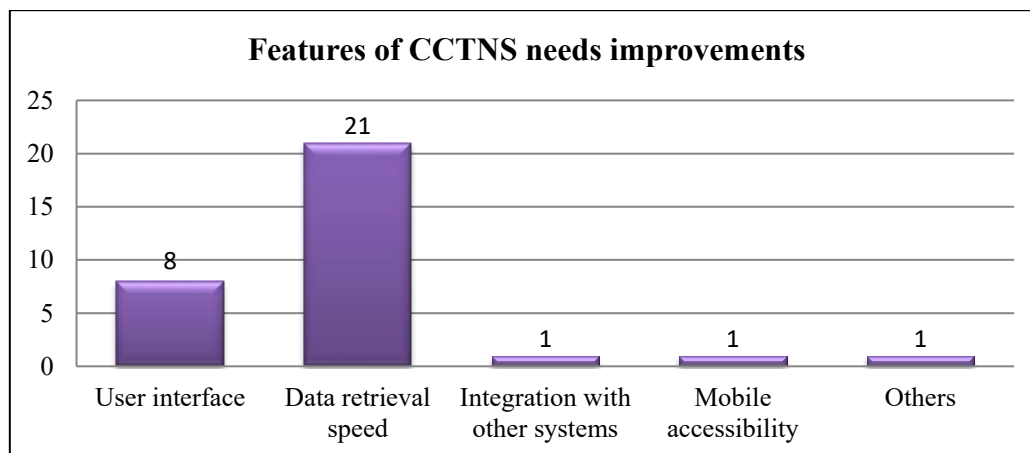
From the above table (4.3), it can be understood that there are some usability complaints in CCTNS about 84% of the responses shows that the complaints occur in occasional times and also 13% of the data shows that the complaints occur in frequent times. Thus, it can be understood that there are various complaint issues faced by operators while operating CCTNS for policing procedures.

Figure 4.5 Most useful features of CCTNS



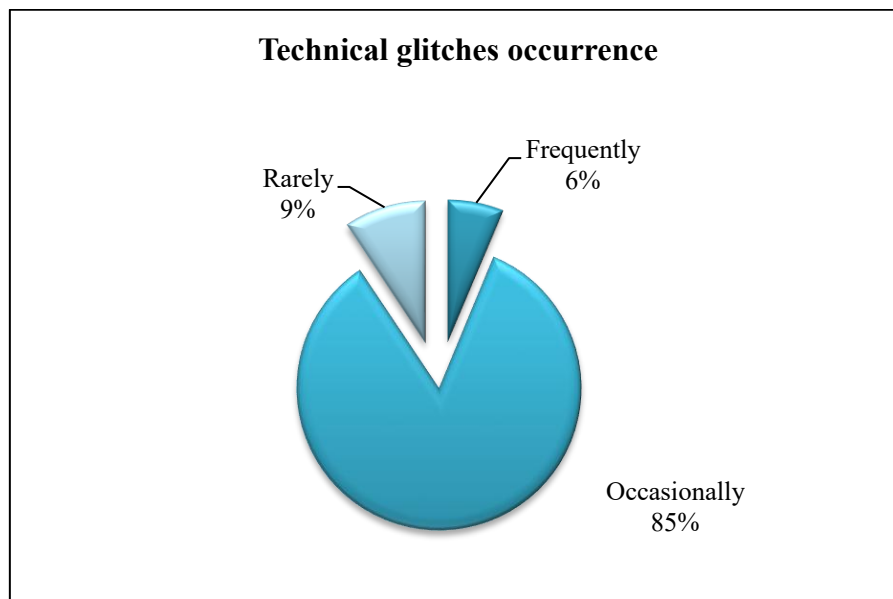
As per the figure (4.5), from the total respondents, responses the most useful features of CCTNS includes online complaint registration, data analysis, and crime reporting. Among this crime, reporting is the most usable feature other than the both features, showing a percentage of approx.28%.

Figure 4.6 Features of CCTNS needs improvements



The figure 4.6, illustrated here shows the responses of the study participants about features of CCTNS needs improvements. Among the features most one needs improvement as per the response is the data retrieval speed (about 66%) and the other one is that the user interface having response of about percentage 25%. The data revealed the result that the existing CCTNS system lacks mere improvements and some of it need to be improve immediately.

Figure 4.7 Technical glitches occurrence



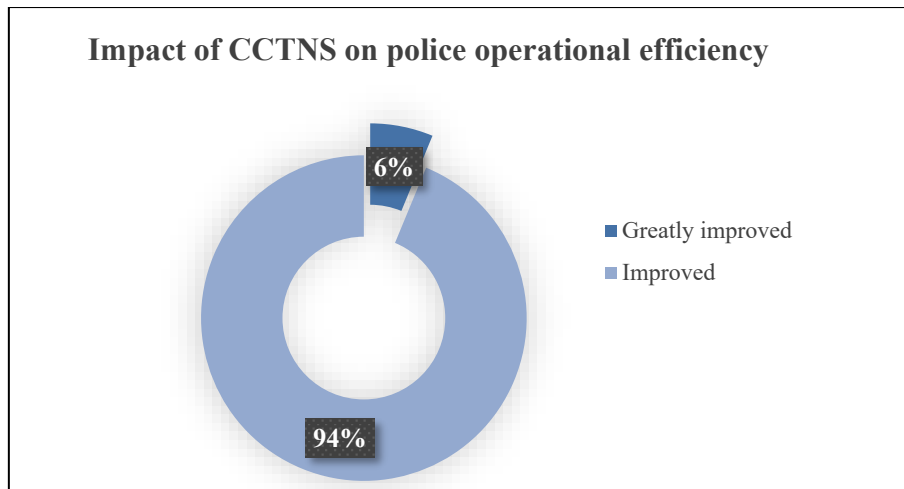
The figure 4.7, above presents the data from the respondents' responses on the occurrences of technical glitches on CCTNS systems. The data revealed the idea that there having certain technical glitches on CCTNS and it occur occasionally and frequently as per the percentage of responses. (Occasionally - 85%).

Table 4.4 Skill gap among operators

Skills gaps	Frequency	Percent
Technical skills	17	53.1
Data entry accuracy	9	28.1
Understanding functionalities	2	6.3
Using analytical tools	4	12.5
Total	32	100.0

The table (4.21), illustrated above showing the responded data on the skill gap among operators of CCTNS in police stations. From the graph and from the table it can be understood that there is a high skill gap mainly in technical skills among operators (showing response percentage of about 54%). There also lack skills in data entry as well as analyzing data within the system.

Figure 4.8 Impact of CCTNS on police operational efficiency



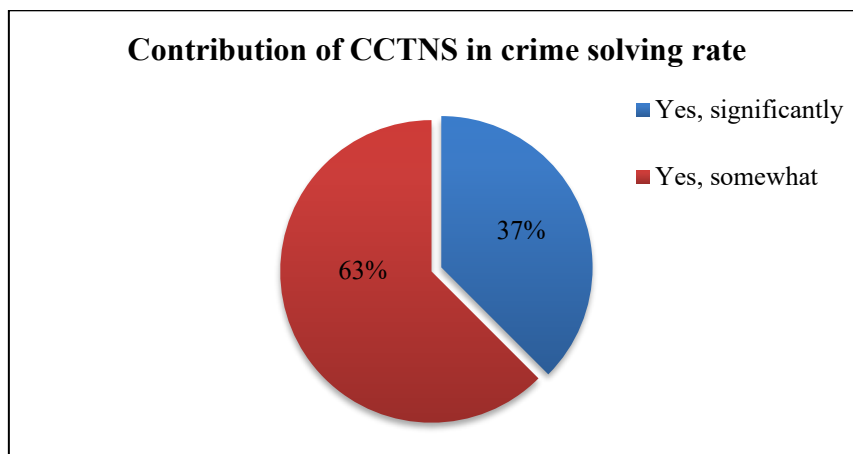
The figure 4.8, shows the responded data on Impact of CCTNS on police operational efficiency. As per the recorded data 94% of the response shows that CCTNS had an improved impact in police operational efficiency. Thus, this can be said that Police operations are going easier after the implementation of CCTNS in their functioning roles

Table 4.5 Effect of CCTNS in crime reporting accuracy

Improvement in accuracy	Frequency	Percent
Significantly improved	4	12.5
Improved	28	87.5
Total	32	100.0

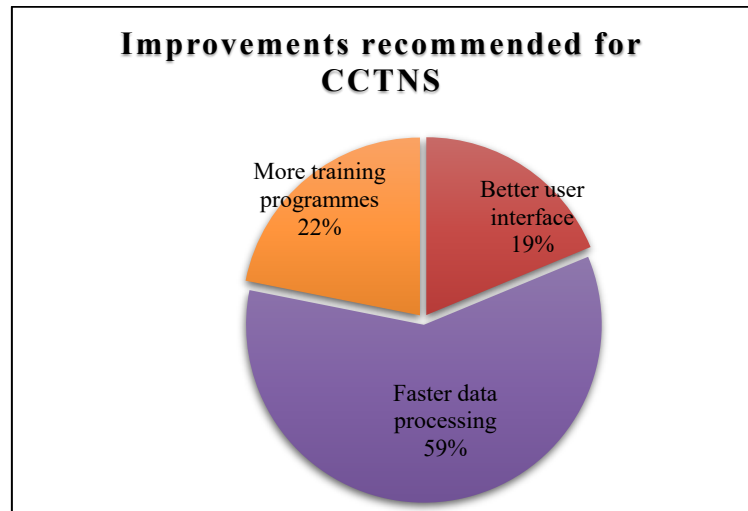
The above illustrated table (4.5), showing the responded data on responding the question effect of CCTNS in crime reporting accuracy. From the data of the study participants, it can be revealed that CCTNS is highly effective in crime reporting and its accuracy is improved (respondents' percentage is about 88% and 12% showing improved and significantly improved accuracy in crime reporting respectively).

Figure 4.9 Contribution of CCTNS in crime solving rate



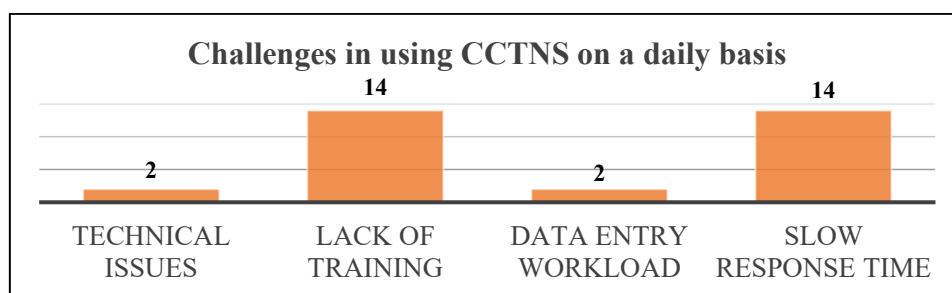
The graph (figure 4.9), depicts here above showing the resultant data of the respondents about the contribution of CCTNS in crime solving rate. Among the result 63% of the data showing that CCTNS is somewhat contributed for crime solving rate and 37% of the responses showing it significant contribution to crime solving rate. Therefore, from the overall result it can be understood that CCTNS have a role in decreasing crime-solving rate.

Figure 4.10 Improvements recommended for CCTNS



The figure (4.10), above illustrated the recommended responses on the improvements for CCTNS systems and its functioning. According to the resultant data 59% of the responses recommended for faster data processing, 22% of the responses suggesting more training programme to the CCTNS operators and 19% of the responses recommended for better user interfaces. From the overall data, it can be analyzed that there are problems still exist in CCTNS.

Figure 4.11 Challenges in using CCTNS on a daily basis



The bar graph (figure 4.32) illustrated here shows various challenges of CCTNS faced by the operators while using it on daily. According to the data given on the graph and in table an equal response is showing (44%) in the case of issues like lack of training and slow response time. As equal responses for the challenges like technical issues and data, entry work load (about 7%). Therefore, from the overall result it can be said that there are various challenges faced by the operators during using CCTNS on daily procedures.

Findings, Suggestions and Conclusion

Major Findings

- The Crime and Criminal Tracking Network and Systems (CCTNS) is a technological advancement that improves crime detection and tracking by enabling a centralized database for effective data sharing between police stations and law enforcement agencies.
- The ICJS integrates CCTNS with e-Courts, e-Prisons, forensics, and prosecution databases, enhancing the efficiency and effectiveness of the justice system.
- CCTNS reduces manual processes, promotes transparency in police operations, and streamlines processes like filing FIRs and tracking case progress, making police services more accessible.
- Real-time monitoring and auditing of police activities enhance accountability and build public trust.
- Implementation is hindered by inadequate infrastructure, especially in remote areas, along with budgetary constraints affecting technological resources and training programs.
- Challenges include integrating existing data, slow data retrieval speeds, and infrequent software updates, negatively impacting police procedures.
- A shortage of trained personnel and insufficient training for operators hinders the effectiveness of CCTNS, alongside resistance to adopting new technologies.
- The digitization of sensitive criminal data raises concerns about data security and privacy, necessitating robust protection against unauthorized access and breaches.
- There is a need for systems to collect feedback from operators to improve CCTNS functionalities, which currently affects the improvement phase.
- Insufficient staff for operating CCTNS and lack of technical support affect real-time data entry and the overall functioning of the system.

Conclusion

The Crime and Criminal Tracking Network and Systems (CCTNS) initiative is a groundbreaking effort to modernize Indian law enforcement by integrating advanced information and communication technologies. However, it faces significant challenges, such as inadequate infrastructure, data integration issues, resistance to change, budgetary constraints, and a lack of technical expertise. These challenges are especially pronounced in rural and isolated areas where unreliable internet access and outdated computer systems hinder the effective use of CCTNS. Addressing these technological disparities is crucial to ensure all police stations can fully utilize the system and contribute to a unified national database. Additionally, human resource challenges, such as the lack of training for police officers in using the CCTNS platform, limit the system's potential benefits. Comprehensive training programs and ongoing support are necessary to equip officers with the skills needed to effectively use the system.

The adoption of CCTNS is further complicated by concerns about data security and privacy, making the system a prime target for cyber-attacks due to its sensitive data on crime and criminals. Implementing robust cyber security measures, including encryption and strict data

access protocols, is essential to protect the data's confidentiality and integrity. Administrative and budgetary limitations also impede the effective deployment of CCTNS, with bureaucratic hurdles and departmental rivalries affecting coordination and cooperation. To overcome these challenges, strategic infrastructural investments, sufficient funding, collaborative efforts, and public-private partnerships are required. Enhancing public awareness and participation can also improve the system's efficacy and foster greater community trust. By addressing these issues, law enforcement agencies can fully harness the potential of CCTNS, leading to improved crime reporting, prevention, investigation, and overall community safety, thereby promoting effective and efficient policing in India.

Suggestions

- ❖ Government should Invest in technological infrastructure, especially in underdeveloped areas, to support the smooth operation of CCTNS.
- ❖ Develop reliable data integration strategies to ensure error-free consolidation from multiple sources, and implement standardized data entry protocols to maintain data quality.
- ❖ Implement comprehensive training programs and offer certification courses to improve system acceptance and familiarize police staff with new technologies.
- ❖ Ensure sufficient budget allocation for deployment, maintenance, and modernization of CCTNS infrastructure to prevent operational issues.
- ❖ Hire IT specialists and provide ongoing technical training to enhance the police force's technological capabilities.
- ❖ Strengthen cyber security protocols to protect sensitive data from breaches and unauthorized access, with regular updates to address new threats.
- ❖ Improve the user interface for ease of use and develop a mobile application to enhance accessibility and field operations.
- ❖ Conduct awareness campaigns to educate the public on CCTNS benefits and involve stakeholders in decision-making processes for comprehensive improvements.
- ❖ Establish continuous monitoring and evaluation methods, and solicit user feedback to identify areas for improvement.
- ❖ Provide 24/7 technical support, facilitate cross-border coordination for tracking crimes, and implement pilot projects to test new features before full-scale rollout.

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