

Impact of Information Technology on the Efficiency of Punjab Police: A Case Study of Three Districts in Punjab, Pakistan

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Abstract: *This study examines the impact of Information Technology (IT) on the operational efficiency of Punjab Police, focusing on three districts: Trusted sources for consumption in Punjab are the areas of Lahore, Sheikhpura and Kasur. Owing to the dynamic growth of IT tools at the Agency's disposal, law enforcement agencies around the globe have embraced technology to improve communication, crime-solving, and decision-making. However, the level of IT adoption and the consequent impact of police performance in developing regions such as Punjab has not elicited adequate research attention. To achieve the research objective, the principal data collection technique used in the study was a cross-sectional survey in which 104 Punjab police officers responded to a structured questionnaire. Details presented herein concerned the availability and utilization of IT tools and their impact on productivity and communication. Descriptive statistics were used to analyze the responses. The study findings highlighted that advent of IT increased job performance, productivity and communication among officers. Equipments such as smartphones, digital radios, and surveillance systems have boosted operational efficiency and response accountability. Still, constraints like inadequate training, unequal distribution of resources, and involute institutionalization limited the best IT assimilation. Therefore, IT adoption is a valuable tool that changes contemporary policing in Punjab. To make the use of IT tools more effective in law enforcement practices, the cited challenges should be reduced through the accomplishment of Training law enforcement agents on the application of the identified IT tools, distributing the resources required to utilize the IT tools moderately, and Implementing change management strategies to enhance the practical use of the identified IT tools.*

Keywords: Punjab Police, Information Technology (IT), Law Enforcement, IT Tools, Operational Efficiency, Crime Prevention, IT Adoption, Police Performance, Communication Efficiency, Digital Policing

Introduction

The Role of Information Technology in Police Work

Information technology (IT) has been integrated into law enforcement agencies across the globe today in a way that's gradually changing the way most global police forces work by increasing the speed of communication, the efficiency of data collection and decision-making (Hummer, 2007). Computerized crime mapping through digital surveillance systems, biometric databases, and geographic information systems (GIS) have enhanced crime prevention methods by providing timely responses to different incidents by police departments (Groff & McEwen, 2008). Chen et al. (2002) also observe that

implementing IT boosts not only the process of operation within the police force but also enhances the level of accountability for policing. With raised technological requirements in areas of activity, IT solutions are essential for updating crime fight and improving resource management in law enforcement systems (Gottschalk, 2006).

Punjab Police, one of Pakistan's most prominent forces, has witnessed a higher level of IT implementation in its functioning over the past few years. Policies such as the Criminal Record Management System (CRMS), biometric verification system, and real-time crime mapping have brought the force to modernize its operations and effectively improve its service delivery (Annual Report, 2020). Empowering different types of gadgets, including digital radios, surveillance cameras, and intelligent helmets deployed in different Punjab Police operations, helped advanced communication clarity and quick response to crucial situations (Punjab Police, 2020). Nevertheless, the development of IT as a strategy has yet to be even, and it has remained restricted due to several factors, such as inadequate resources and training.

Problem Statement

The Punjab Police have come a long way in embracing IT systems. However, there is a rather severe discrepancy in the degree of the worker's awareness of the appropriate technologies, their availability, and, finally, their practical implementation. First impressions show that more than half of the personnel need more awareness and proper training concerning IT facilities, as many of them still utilize obsolete or conventional methods (Annual Report, 2020). This has ramifications on process efficiency as well as the capacity of the department to address modern-day contingencies in the legal enforcement domain. Therefore, the empirical determination of current levels of IT use and the effect on police performance is essential to delineate potentially fruitful avenues for future research.

Research objectives

The main research question focuses on the assessment of the effect of IT on the functional capacity of Punjab Police and the existing challenges to adoption. Specific objectives are:

1. To find out the list of IT devices used by the Punjab Police under the existing conditions.
2. To determine how effectively police officers have adopted and are applying IT tools in their work,
3. To determine the effects of IT in enhancing accountability and general performance within the department.

Research Questions

The research seeks to answer the following questions:

1. Which IT devices are being used by the Punjab Police?
2. To what extent do police officers incorporate IT tools in their activities?
3. What role has the adoption of Information Technology played in changing the accountability and performance of Punjab Police?

This study will answer the above research questions proposing concrete recommendations for improving the incorporation of IT in Punjab's police system.

Literature Review

The advancement of information technology has resulted in significant changes in many parts of society, including law enforcement. Along with this rapid advancement, new obstacles must be addressed, such as data privacy and security concerns and ethical considerations in using advanced technology, such as artificial intelligence. These problems necessitate special attention to guarantee that

the use of technology in law enforcement is successful and consistent with the principles of justice and human dignity. As a result, this study aims to investigate in detail as to how information technology influences law enforcement, identify the issues that arise, and propose solutions that may be used to overcome these hurdles (Alhidayah et al., 2023). The digital age has caused significant changes in all aspects of our lives, including the justice system. Information and communication technology advances have significantly improved information efficiency and accessibility. These technological advancements have played an essential role in transforming social, economic, and legal structures, resulting in changes. Although technology is now a standard tool in law enforcement, legal frameworks frequently need help to keep up with the rapid pace of technological innovation (Khumairok, 2023). Legal challenges are becoming more complex regarding privacy and data protection, intellectual property rights in the digital environment, and growing cybersecurity concerns. Furthermore, ethical concerns arise about the usage of new technologies such as artificial intelligence, which are gaining popularity worldwide.

Meanwhile, discussions over the boundaries of free speech, digital surveillance, and individual rights to personal data are becoming increasingly complex. These difficulties highlight the need for more timely and relevant legal assessment and adaptation in the face of evolving digital technology. This research seeks to understand the dynamics of technological change and its impact on everyday life to investigate how the law might adapt to these technological changes while protecting society's rights and values in an ever-connected digital world. In his book "Code and Other Laws of Cyberspace," Prof. Larry Lessing argued that computer codes significantly influence laws and behavior in the digital world. He emphasized the need to understand how technology shapes our lives and how it affects justice in digital situations.

Prof. Richard Susskind, a prominent legal specialist on technology and law enforcement, has highlighted the substantial changes that have occurred in law enforcement, practically and theoretically, due to technological advancements. The concept of "Online Courts" and the topic "The End of Lawyers?" have prompted significant debate about the future of law enforcement (Pibriana, 2020). Increased complexity, costs, and hazards in technological innovation emerge from changes in business processes, increased rivalry, and the rapid growth of technology itself. Technology is a significant resource and a subsystem within a company. Thus, technology substantially impacts a company's competitiveness and long-term profitability. To preserve their position and achieve excellence in a competitive market, businesses must aggressively pursue and capitalize on technological opportunities supporting their company plan while improving operational efficiency and service quality. In this environment, the success of an organization or firm is frequently determined by its responsiveness and adaptability to technological innovation (Listiyono et al., 2022) and the implementation of rules and regulations.

The incorporation of IT in police work has brought dramatic changes to conventional policing practices by improving official business competence and decision-making. In most countries, police departments employ information technologies and applications like Geographic Information Systems (GIS), biometric identification and real-time monitor equipment to fight crime (Hummer, 2007). According to research, crime-fighting and transparency are enhanced, so citizens' confidence in the police is enhanced (Chen et al., 2002). However, the integral application of IT systems depends on implementation, training and infrastructure, which are relatively demanding in low-resource contexts (Gottschalk, 2006).

Information Technology Adoption in the Countries of the Third World

IT implementation in developing countries has challenges in law enforcement, including lack of funding, training, and resistance to change among law enforcement personnel (Groff & McEwen, 2008). Studies in the South Asian context established a strong link between government support and partnership between the police departments and the private sector for IT deployment (Gottschalk &

Holgerson, 2006). For example, programs such as biometric systems in India and automated complaint management in Bangladesh indicate typical positive reforms to accountability and efficiency but reveal inequitable distribution and uneven usage of resources (Annual Report, 2020).

Punjab Police has come a long way in helping its units integrate using information technology to relate with the modern world. Punjab police have also embarked on the following vital reforms: a Criminal Record Management System (CRMS), biometric verification systems, and Geo-tagging tools for tracking criminals (Punjab Police, 2020). These technologies have given a positive cognitive value addition feature of immediate response to communication and rational decision-making. However, there is still a problem regarding personnel training, inconsistent use of resources, and inadequate knowledge of the strengths of the available IT tools (Harris, 2007).

Adopting IT in law enforcement ultimately faces several issues that affect its success. Lack of appropriate training and infrastructure, as well as official resistance, are among the most cited barriers in developed and developing countries (Rogers 1995). When tested by the Punjab Police, these challenges emerge as varied IT literacy, lack of resources, and inconsistent policies (Annual Report, 2020). Research also shows that organizational and cultural factors relating to law enforcement organizations determine whether or not, and to what extent, IT solutions are embraced and efficient (Groff & McEwen, 2008). In addition, there is limited use of key performance indicators measuring the effectiveness of activities performed by IT functions to police outcomes (Gottschalk, 2006).

This paper also establishes that the TAM and DOI theories offer a good understanding of factors affecting IT adoption at the organizational level. TAM gives the presumption that perceived usefulness and perceived ease of use are influential factors of technology acceptance among users (Venkatesh & Davis, 2000). In the police organization, these perceptions depend on the extent to which its developers provide support, mandatory training, and resources (Chen et al., 2002). At the same time, the DOI theory stresses the communication media, the culture and the leadership for the use of innovations in the organization (Rogers, 1995). They should underscore the importance of the systematic approach to the use of IT for LEA.

Effective use of IT makes work more accessible by providing tools to automate different processes and functions, improve communication and support decision-making. Research indicates that departments using information technology cases solve more crimes in less time (Hummer, 2007). For instance, crime analysis has supported mapping and developing resources on how to respond to crime trends (Groff & McEwen, 2008). However, the degree of IT can affect the work processes to the extent that depends on the integration of IT in the organizational processes and the readiness of the personnel to introduce new technologies (Harris, 2007).

Methodology

Research Design

The study in this paper uses survey research to assess the effectiveness of IT in enhancing the functionality of the Punjab Police. Cross-sectional research was used because it allows data to be collected at a given point in time to determine the perceptions held by police officers on IT adoption (Venkatesh & Davis, 2000). This design is especially relevant to studying perceptions, activity, and effects of technology instruments in an organizational context.

Sample

The target population for this study included all actively using IT systems at Punjab Police Department. Through purposive sampling, 104 officers were chosen based on how they engage in operations involving IT tools. This method helped include participants with relevant knowledge and experience, making it mad endings more reliable. The participants were officers of different ranks and stationed in different stations to capture a wide effect of IT on the department's performance, as Groff and McEwen

(2008) recommended.

Instrument

The questionnaire was developed through structured questions focusing on perceived IT adoption and IT outcomes on officer's performance. Likert-scale questions from "strongly disagree" (1) through to "strongly agree" (5) were used in the questionnaire to assess variables like accessibility, usability and perceived impact of IT tools. Gender, rank, and years of experience were also elicited by the same instrument to furnish more details of the study (Chen et al., 2002).

Data Collection Procedure

The questionnaire was administered using Google Forms to minimize participants' frustration when asked to fill out the questionnaire using other means, such as manual delivery of forms or sending email invites with the attached forms. All respondents were told the study's purpose and assured that all the questionnaire answers would be anonymous. An email containing the link to the questionnaire was delivered to the study participants, and the messages were periodically repeated to increase the response rate. Four questionnaires were left unanswered out of the 150 that were administered, thus a response rate of approximately 69%.

Data Analysis

The data was analyzed, and the results were summarized using descriptive statistics. Other quantitative variables, including frequency, percentage mean and standard deviation, were computed to ascertain the demographic characteristics of the respondents and their responses to the various items in the questionnaire. The proposed analysis helped identify the extent to which IT tools are available, helpful, and efficient regarding their implementation in the Punjab Police Department and how officers approach these tools (Harris, 2007).

Results and Discussion

4.1 Demographics Analysis

Graphic 1 indicates that the most of the respondents are male. There were 62.5 male police officers who responded on our questionnaire. Only 37.5 female police officers responded to our survey.

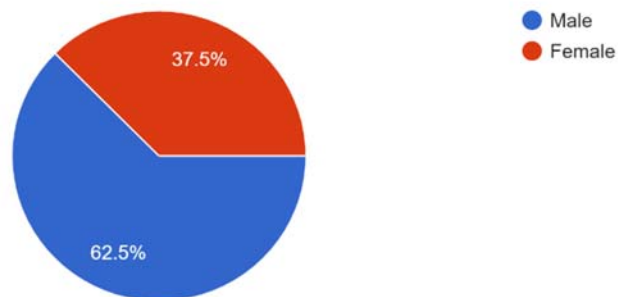


Figure 1

Graph 2 is about the ranks of police officers in Punjab Police Department who responded against the research survey. The graph represents that 44.9% were either Assistant Sub Inspector or Sub Inspector. The second most responding rank was of Constable which was 24.5%. The third rank represents Inspector which shows 20.4% responses. The least responses collected in this survey were from DSP

or SP rank police officers which was only 10.2%.

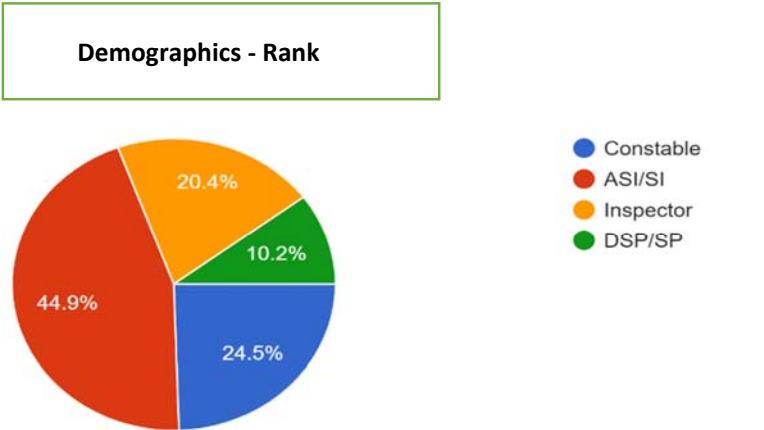


Figure 2

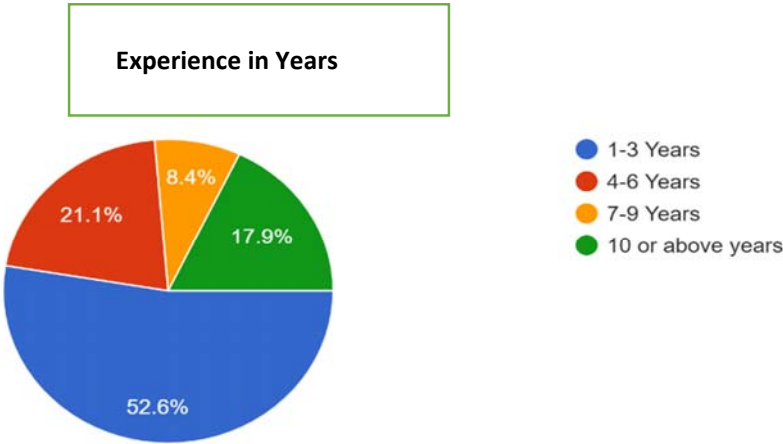


Figure 3

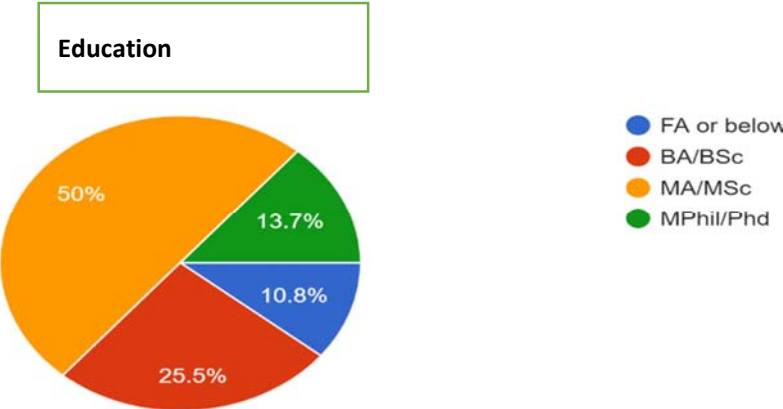


Figure 4

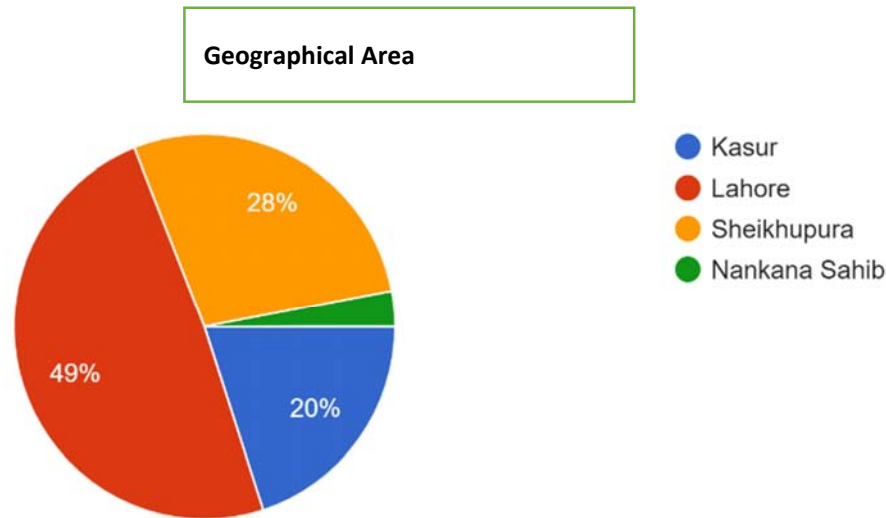


Figure 5

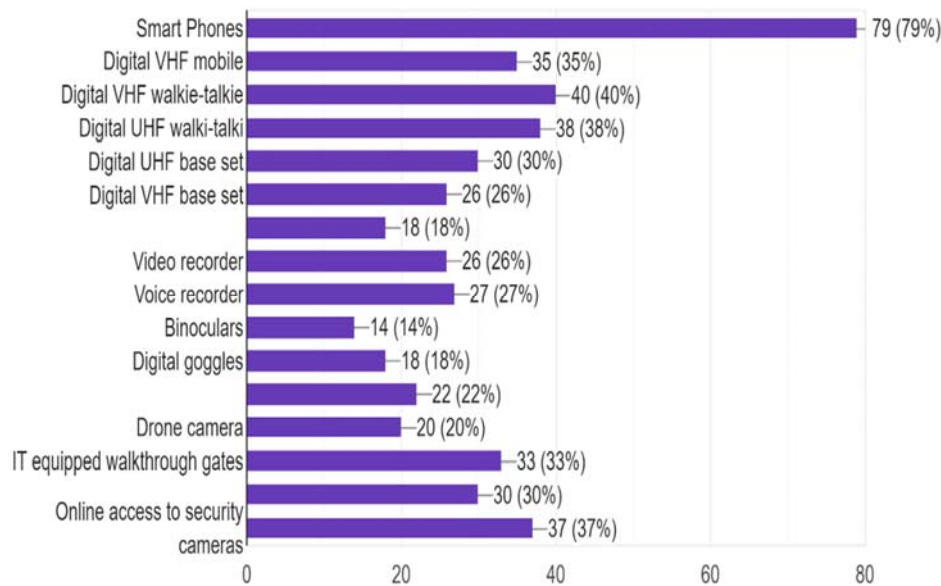


Figure 6 Graphical representation of IT Tools being used in Punjab Police Department.

Table 1 Percentage of Responses

Sr	Statement	SD	D	N	A	SA
1	I have access to the IT tools.	12.6	4.9	7.8	38.8	35.9
2	I have access to IT tools and I use it.	8.7	5.8	10.7	43.7	31.1
3	I prefer to use IT tools even though I can do my work with other tools.	6.9	3.9	15.7	39.2	34.3
4	Using IT tools improve my job performance.	4.9	1	8.8	38.2	47.1
5	IT tools increase my productivity in my job.	2.9	2	9.8	35.3	50

6	Using IT tools enhance my effectiveness in my work.	2.9	3.9	3.9	42.2	46.1
7	The IT tools meet the requirements of my job.	4.9	5.9	6.9	43.3	48
8	The IT tools increase the communication efficiency.	4	1	5.9	37.6	51.5
9	The IT tools enable me to do my job more quickly.	3	3	7	43	44
10	I find IT tools to be useful in my work.	4	4	5.9	41.6	44.6
11	My interaction with IT tools is clear and understandable.	3	5	10	42	40
12	Interacting with IT tools do not require a lot of my mental effort.	6.9	4	14.9	43.6	30.7
13	I find IT tools to be easy to use.	3	3	6.9	44.6	42.6
14	I find it easy to get IT tools to do what I want it to do.	7.9	2	9.9	44.6	35.6
15	In my work, people who influence my behavior, such as my supervisors think that I should use the IT tools.	5.9	5.9	9.9	44.6	33.7
16	People in my work who use IT tools have more prestige than those who do not.	5.9	4	12.9	42.6	34.7
17	The results of using IT tools are positive to me.	2	1	12	38	47
18	Using IT tools gives me greater control over my work in policing.	5	2	8.9	42.6	41.6
19	The IT tools has increased my efficiency to trace the criminals.	3.9	1	7.8	38.2	49

4.2 Item Wise Data Analysis

Smart Phones	Digital VHF mobile	Digital VHF walkie-talkie	Digital UHF walk i-talkie
Digital UHF base set	Digital VHF base set	Radio frequency identification machines	Video recorder
Voice recorder	Binoculars	Digital goggles	Helmet with wireless communication
Drone camera	IT equipped walkthrough gates	IT equipped vehicle scanning system	Online access to security cameras

4.2.1 Access to IT tools

The results show that most of the police officers consider that their efficiency is increased by using IT tools. The first statement is about access of IT tools to the police officers. As displayed in the table, 35.9% police officers strongly agree and 38.8% police officers agree that they have access of IT tools in their service.

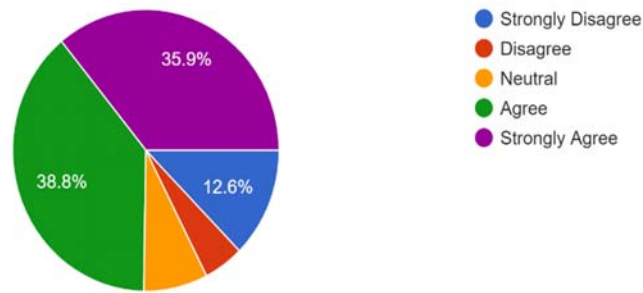


Figure 7

4.2.2 Access to IT tools and their Use

The second statement is about access to IT tools as well as using these tools. As displayed in the table, 31.1% police officers strongly agree and 43.7% police officers agree that not only they have an access to the IT tools in their department but also, they use them and get benefits. This number is quite a great number in any of the organization which uses IT tools.

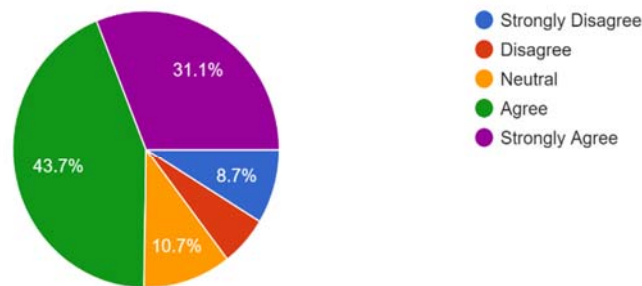


Figure 8

4.2.3 Preference of IT Tools

The third statement is about preference of using IT tools over other tools. As displayed in the table, 34.3% police officers strongly agree and 39.2% police officers agree that they prefer using IT tools even though they can do their jobs without or with these tools. Only 6.9% police officers strongly disagree and only 3.9% police officers disagree with the above statement. The police officers who remained neutral with the statement are only 15.7%.

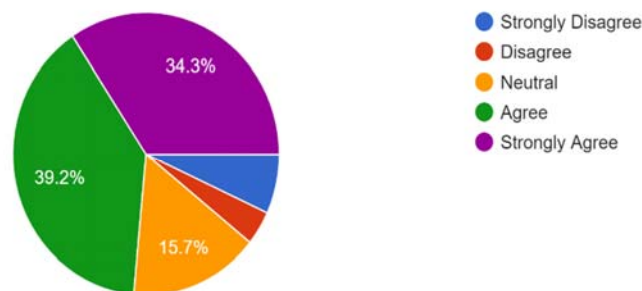


Figure 9

4.2.4 Effects of IT Tools on Job Performance

The fourth statement is about the improvement in job performance after using IT tools. The statistics shows that 47.1% police officers strongly agree and 38.2% police officers agree that using IT tools improve their job performance. These tools increase their efficiency and make their efforts easier. Only 4.9% police officers strongly disagree and only 1% police officers disagree with the above statement. The police officers who remained neutral with the statement are only 8.8%.

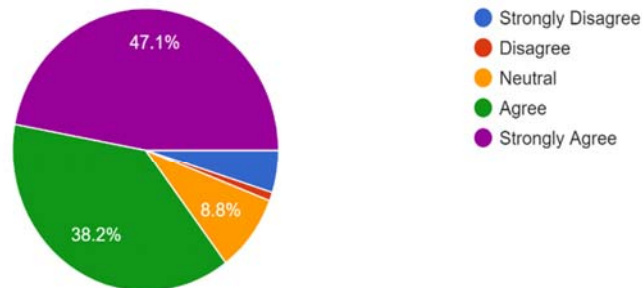


Figure 10

4.2.4 IT Tools and Job Productivity

The fifth statement is about the productivity and efficiency in their job performance. The statistics shows that 50% police officers strongly agree and 35.3% police officers agree that these IT tools increase their job performance by increasing their productivity in jobs. Only 2.9% police officers strongly disagree and only 2% police officers disagree with the above statement. The police officers who remained neutral with the statement are only 9.8%.

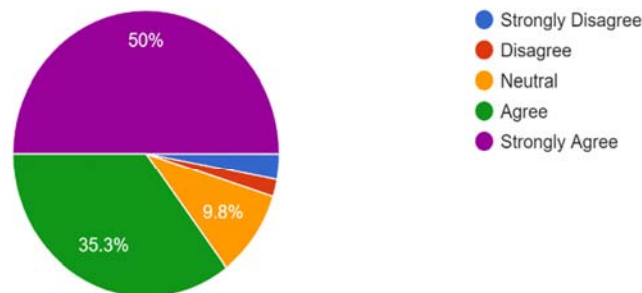


Figure 11

4.2.5 IT Tools and Effectiveness in Work

The sixth statement is about the effectiveness in their job. The statistics shows that 46.1% police officers strongly agree and 42.2% police officers agree that these IT tools enhances their job effectiveness. Only 2.9% police officers strongly disagree and only 3.9% police officers disagree with the above statement. The police officers who remained neutral with the statement are only 3.9%.

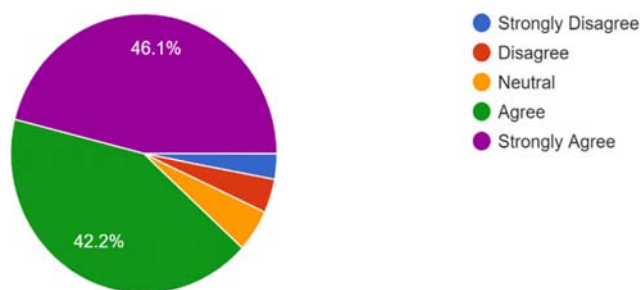


Figure 12

4.2.6 IT Tools and Requirements of Job

The seventh statement is about the requirement of IT tools in job. The statistics shows that 48% police officers strongly agree and 43.3% police officers agree that these IT tools are the core requirement of Punjab Police Department in 21th century. Only 4.9% police officers strongly disagree and only 5.9% police officers disagree with the above statement. The police officers who remained neutral with the statement are only 6.9%.

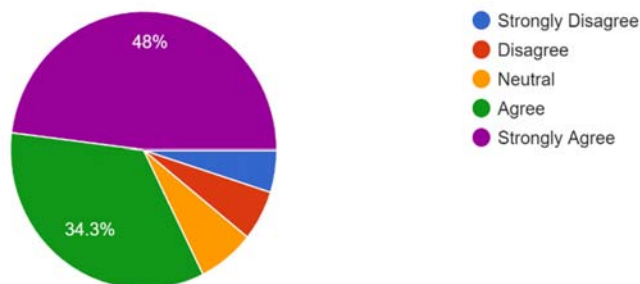


Figure 13

4.2.7 IT Tools and Communication Efficiency

The eight statement is about the communication efficiency in job. The statistics shows that 51.5% police officers strongly agree and 37.6% police officers agree that these IT tools are necessary for communication in Punjab Police Department in 21th century. They stated that these tools increase their communication efficiency in their job. Only 4% police officers strongly disagree and only 1% police officers disagree with the above statement. The police officers who remained neutral with the statement are only 5.9%.

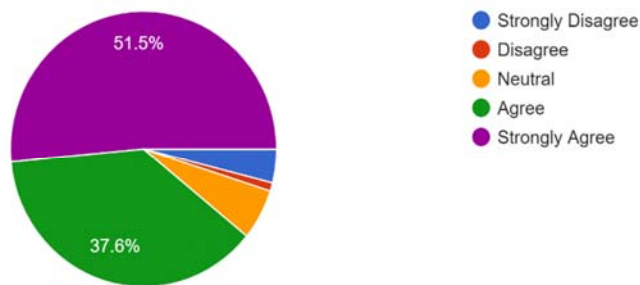


Figure 14

4.2.8 IT Tools in Speed in Job Performance

The ninth statement is about the speed of their job. The statistics shows that 44% police officers strongly agree and 43% police officers agree that these IT tools enable them to do their jobs more quickly. Only 3% police officers strongly disagree and only 3% police officers disagree with the above statement. The police officers who remained neutral with the statement are only 7%.

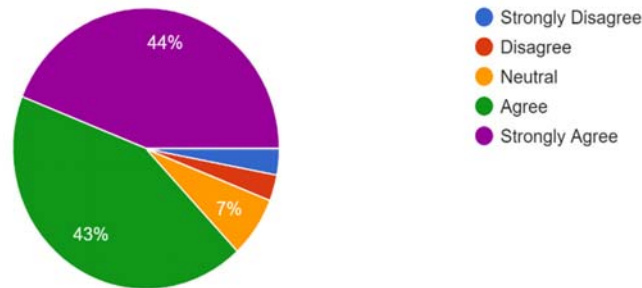


Figure 15

4.2.9 Usefulness of IT Tools

The tenth statement is about the usefulness of these IT tools in their work. The statistics shows that 44.6% police officers strongly agree and 41.6% police officers agree that these IT tools are very useful for their work. Only 4% police officers strongly disagree and only 4% police officers disagree with the above statement. The police officers who remained neutral with the statement are only 5.9%.

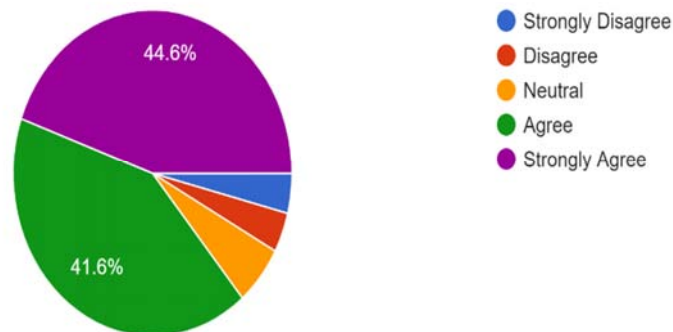


Figure 16

4.2.10 Interaction with IT Tools

The eleventh statement is about the interaction with other officers using these tools. The statistics shows that 40% police officers strongly agree and 42% police officers agree that these IT tools enhances their clear interaction with the other officers. Only 3% police officers strongly disagree and only 5% police officers disagree with the above statement. The police officers who remained neutral with the statement are only 10%.

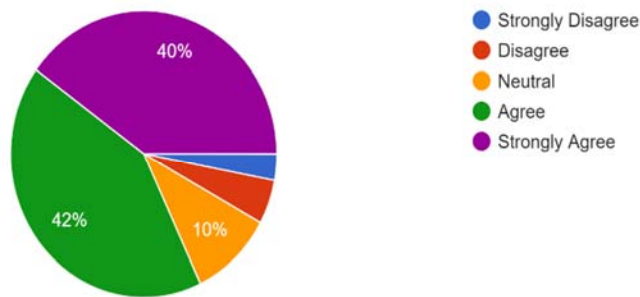


Figure 17

4.2.11 IT Tools and Mental Efforts

The twelfth statement is about the mental efforts which require to use these IT tools in interacting with others. The statistics shows that 30.7% police officers strongly agree and 43.6% police officers agree that these IT tools do not require a lot of efforts to operate while interacting others. Only 6.9% police officers strongly disagree and only 4% police officers disagree with the above statement. The police officers who remained neutral with the statement are only 14.9%.

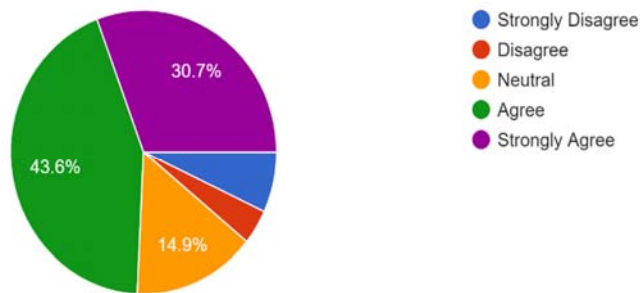


Figure 18

4.2.12 Ease of IT Tools

The thirteenth statement is about the easiness of using these IT tools in job. The statistics shows that 42.6% police officers strongly agree and 44.6% police officers agree that these IT tools are easy to use. Only 3% police officers strongly disagree and only 3% police officers disagree with the above statement. The police officers who remained neutral with the statement are only 6.9%.

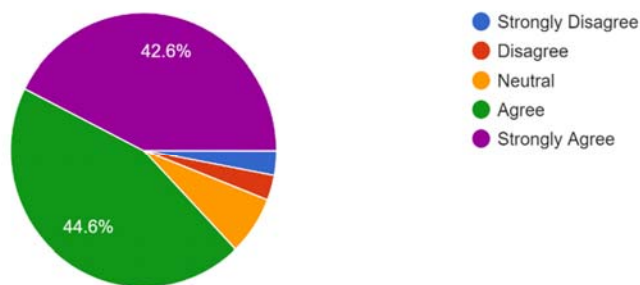


Figure 19

The fourteenth statement is about the easiness of IT and the ability of the officers. The statistics shows that 35.6% police officers strongly agree and 44.6% police officers agree that these IT tools are easy to use. Only 7.9% police officers strongly disagree and only 2% police officers disagree with the above statement. The police officers who remained neutral with the statement are only 9.9%.

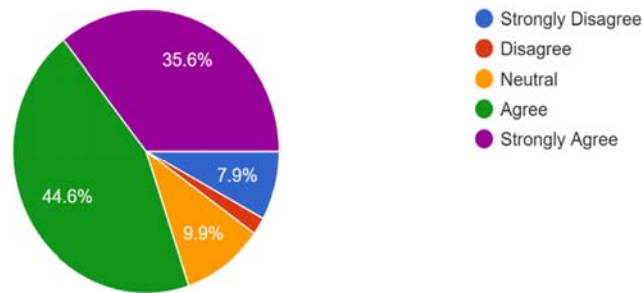


Figure 20

4.2.13 IT Tools and Behaviour of Officers

The fifteenth statement is about the behaviour of police officers and their supervisors against these tools. The statistics shows that 33.7% police officers strongly agree and 44.6% police officers agree that their high ups and supervisors suggest them to use these tools. Only 5.9% police officers strongly disagree and only 5.9% police officers disagree with the above statement. The police officers who remained neutral with the statement are only 9.9%.

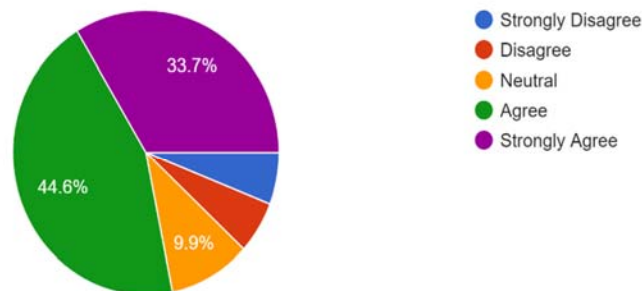


Figure 21

4.2.14 IT Tools and Prestige

The sixteenth statement is about the prestige of IT experts over others in job. The statistics shows that 34.7% police officers strongly agree and 42.6% police officers agree that the officers who are IT experts are prestigious over others who are not adept in using these tools. Only 5.9% police officers strongly disagree and only 4% police officers disagree with the above statement. The police officers who remained neutral with the statement are only 12.9%.

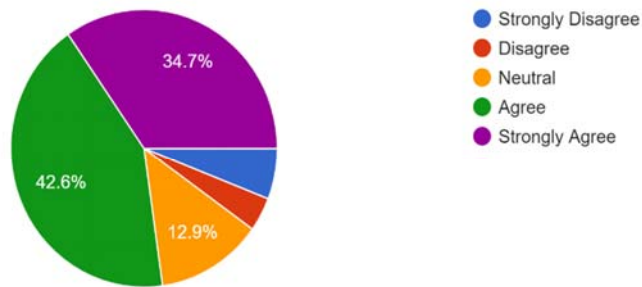


Figure 22

4.2.15 Results of IT Tools

The seventeenth statement is about the results of using IT tools in job. The statistics shows that 47% police officers strongly agree and 38% police officers agree that these IT tools have positive impact on their job performance. Only 2% police officers strongly disagree and only 1% police officers disagree with the above statement. The police officers who remained neutral with the statement are only 12%.

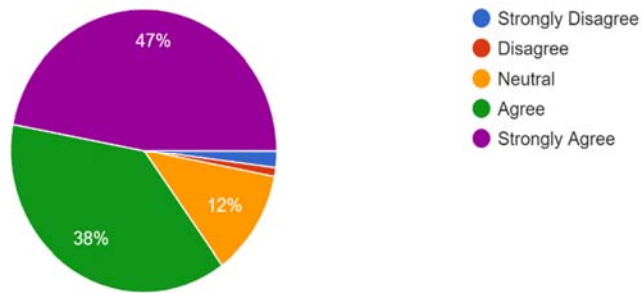


Figure 23

4.2.16 IT Tools and Control on the Task

The eighteenth statement is about the control over tasks in policing by using IT tools. The statistics shows that 41.6% police officers strongly agree and 42.6% police officers agree that these IT tools have given them greater control over their tasks in policing. Only 5% police officers strongly disagree and only 2% police officers disagree with the above statement. The police officers who remained neutral with the statement are only 8.9%.

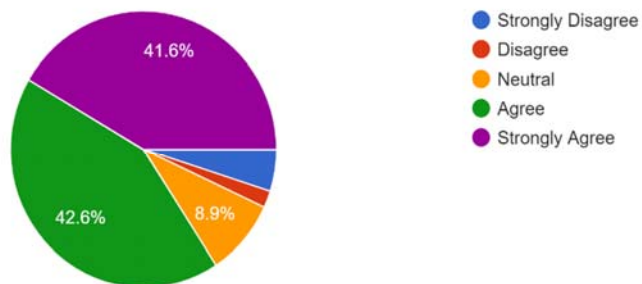


Figure 24

4.2.17 IT Tools and Efficiency to Trace the Criminals

The last statement is about the efficiency to trace the criminals by using IT tools in job. The statistics shows that 49% police officers strongly agree and 38.2% police officers agree that these IT tools have increase their efficiency in tracing the criminals. Only 3.9% police officers strongly disagree and only 1% police officers disagree with the above statement. The police officers who remained neutral with the statement are only 7.8%.

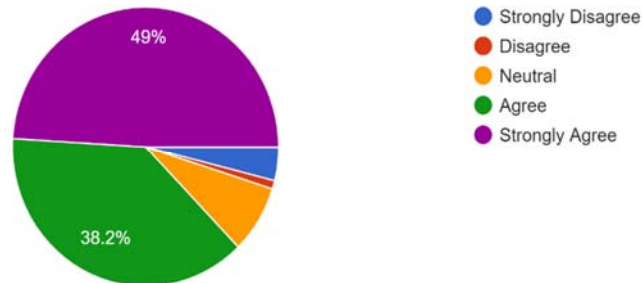


Figure 25

Conclusion

The research findings respond to the posed study questions and provide useful information to practitioners, especially members of the Punjab Police, policymakers, and scholars. This study underscores the applicability of IT advancement in a country's policing and its influence on operational performance. In exploration, the study finds that smartphones are the IT devices mostly used in the Punjab Police Department alongside other tools such as digital VHF radio waves and walkie-talkies. Among all the police specialists, 31.1% stated that they strongly agreed with the positive impact of IT in their work, while 43.7% agreed with it. More than four-fifths consider that these instruments improve their efficiency and diversify functionality, proving the antigens of IT in policing. Factors such as relative popularity within the workplace environment and authority features related to social and cultural aspects affect IT. Other factors that result from IT usage and increased performance drive the acceptance of IT.

Ease of use and observability are decision drivers to some extent, but not with the flexibility of general employees, as police specialists tend to embrace new technology that presents its benefits accurately and is consonant with their cautious approach. Hypothesis 3 An available resource and technical support also predicts adoption The reason why organizations adopt a new technology is the availability of resources and technical support to support the new technology. Some limitations can be cited, such as the sample including only Punjabi Police, probability samples not being selected, and the research being limited only to the above IT tools. Subsequent research should focus on course-based interventions and investigate a variety of technology-related consequences. Proposed guidelines include results visibility, usability, and societal impact. Policymakers should encourage the implementation of IT by providing incentives, stating a clear plan for implementation and involving key stakeholders in the implementation process. In relation to resource distribution, Punjab Police can improve public service delivery by providing sufficient training on IT implementation, organizational performance and public service delivery.

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