# Demographic Differentiation of Technology Adoption Behavior of Police Personnel in Rajasthan

**THESIS**

**Submitted in partial fulfilment of the requirements for the degree of**
DOCTOR OF PHILOSOPHY

By
**UMESH MISHRA**

ID: 2018PHXF0107P

**Under the supervision of**

## Prof. Virendra Singh Nirban

&

the co-supervision of

## Prof. Chandra Shekhar



# BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI

**2024**

# BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI

# CERTIFICATE

This is to certify that the thesis titled **Demographic Differentiation of Technology Adoption Behavior of Police Personnel in Rajasthan** submitted by **Umesh Mishra** holding ID No: **2018PHXF0107P** for the award of Ph.D. of the Institute embodies original work done by him under our supervision.

| | |
|---|---|
| **Signature of the supervisor** | **Signature of the co-supervisor** |
| **Prof. Virendra Singh Nirban** | **Prof. Chandra Shekhar** |
| **Professor** | **Professor Emeritus** |
| **Department of Humanities and Social Sciences** | **Department of EEE** |
| **Birla Institute of Technology and Science (BITS)Pilani, Pilani Campus, Rajasthan, 333031** | **Birla Institute of Technology and Science (BITS) Pilani, Pilani Campus, Rajasthan, 333031** |
| **Date:** | **Date:** |

# ACKNOWLEDGEMENTS

# SUMMARY

This research study investigates the technology adoption behavior of the police personal in Rajasthan. More specifically it addresses the question of how demographic characteristics influence and moderate the technology adoption behavior.

Chapter 1 of the thesis presents an overview of the thesis topic: technology adoption behavior among police personnel in Rajasthan. The scope of the topic of the thesis demands a background insight into how technology has evolved over the last few centuries in general to the current context. It also presents an overview of the historical background of the evolution of policing in India as well as globally. The chapter delves into the aspects of technology and society, information and communication technology, technology adoption and policing, and the rapid innovations in all-pervasive internet-based platforms that can be utilized for communication and information storage, retrieval, and dissemination purposes. The chapter then lays out the objectives of the research work.

The literature review section of the study in Chapter 2 presents the discursive analysis of the existing research in the sphere of technology adoption behavior of users, particularly in policing and law enforcement. The chapter starts with reviewing technology and policing in general and then explains with critical insight the specific arena of technology adoption in the policing domain. The next section presents the domain's theoretical background and the models' nuances. The sections cover the major theories and their constructs and lucidly explain how the domain of technology adoption has evolved over the last few decades. Following the theories, the section provides a detailed review of the studies employing these theories in various contexts and with

modifications to study the phenomenon of adoption behavior. Based on the exhaustive literature review, the chapter presents the research gap identified for the study.

Chapter 3 presents the research design of the study in detail. To fulfill the study's objectives, an in-depth exploration of the user behavior (police personal behavior) in terms of adopting technology, a mixed method approach. This study used a sequential explanatory mixed-method approach involving two phases to explore the study's objectives. The design involves combining the quantitative and qualitative aspects to comprehensively understand the user behavior – the ICT adoption behavior and the IFTK adoption behavior. The findings from the quantitative analysis help in understanding the perception of police personnel towards adopting and using ICT and IFTK. Qualitative data in semi-structured interviews was used to explain and understand the important factors responsible for adopting and using the ICT and IFTK. Two scales have been developed for quantitative survey. The ICTAS has been designed to capture the perceived behavior of police personnel concerning the determinants of ICT Adoption. The IFTKAS has been designed to capture the perceived behavior of the police personnel concerning the determinants of the IFTK Adoption. The theoretical framework used for this study has been derived from the Unified Theory of Acceptance and Use of Technology (UTAUT). Some of the constructs have been borrowed from the original model and customized, while others were added to suit the context of the study. The primary data for the study was collected from police personal across Rajasthan. The population and sample size would be determined the spatiality and the Rajasthan Police Organizational structure. A multi-phase sampling approach was used for the final sample selection.  Once the reliability and validity of the scales were established, the data collection from the actual sample was commenced. The data was compiled using SPSS version 24 software. The invalid responses were identified and discarded. The SPSS software was used to draw descriptive and inferential data analysis statistics. Independent samples t-test was utilized for

demographic group wise differences and to record the significance of the differences. Similarly, ANOVA was utilized for demographic group wise differences and to record the significance of the differences if any.

For deriving the results, the analysis in Chapter 4 includes using a parametric test, namely- an independent samples-t test for demographics having two groups and ANOVA for demographics with more than two groups. Moreover, the analysis presented demographic differentiation in technology adoption behavior at a meta-level, i.e., at a cumulative score of the independent variables, and at the micro level, i.e., at the individual determinant level. The analysis focused on presenting the difference, if any, between demographic groups among Police personnel concerning ICT Adoption and recording the significance of the difference; the difference, if any, between demographic groups among Police personnel with respect to IFTK Adoption, and to record the significance of the difference; difference, if any, between demographic groups and the Determinants of ICT Adoption among Police personnel and to record the significance of the difference and the difference, if any, between demographic groups and the Determinants of IFTK Adoption among Police personnel and to record the significance of the difference.

The discussion in Chapter 5 reveals interesting and potentially significant behavioral aspects of the police personnel engaging with technology. This chapter discusses results obtained through statistical analysis in the previous chapter. The chapter considers the concerned demographic variable and the obtained result about that demographic variable and then substantiates the finding based on the context of the study, existing research observations, and theoretical groundings. The discussion also embeds the qualitative inputs gathered via the interviews of police personnel and weaves into the narrative discourse into the findings from quantitative analysis. Many of the quantitative findings have been strongly supported by

qualitative inputs gained from the interviews. However, there have been some findings contrary to existing research; for example, the role of gender as a moderating variable for technology adoption was contrary to popular belief. This also indicates that latent extraneous factors, such as an organization's cultural context, may also play an important role in the adoption behavior of technology users.

Chapter 6 presents the study's major findings, policy implications, and future scope of work in the area of technology adoption behaviors of police personnel.

# Table of Contents

# List of Tables

# List of Figures

# Abbreviations

ICT         :       Information and Communication Technology

IFTK        :       Investigative Forensic Toolkit

ICTAS       :       Information and Communication Technology Adoption Scale

IFTKAS      :       Investigative Forensic Toolkit Adoption Scale

NCRB        :       National Crime Record Bureau

TAM         :       Technology Acceptance Model

TAM2        :       Technology Acceptance Model 2

TAM3        :       Technology Acceptance Model 3

UTAUT       :       Unified Theory of Acceptance and Use of Technology

TPB         :       Theory of Planned Behaviour

DTPB        :       Decomposed Theory of Planned Behaviour

IT          :       Information Technology

IS          :       Information Systems

COPS        :       Community Oriented Policing Services

MDCs        :       Mobile Data Centers

AFRS        :       Automated Field Reporting Systems

RMS         :       Record Management Systems

CAD         :       Computer-Aided Dispatch

CCTV        :       Closed Circuit Television

PPH         :       Prefectural Police Headquarters

AFIS        :       Automated Fingerprint Identification Systems

ISPs        :       Internet service providers

CCIS        :       Crime and Criminals Information System

| | | |
|---|---|---|
| **CIPA** | : | Common Integrated Police Application |
| **CCTNS** | : | Crime and Criminal Tracking Network & Systems |
| **PE** | : | Performance Expectancy |
| **EE** | : | Effort Expectancy |
| **SE** | : | Self-Efficacy |
| **SI** | : | Social Influence |
| **AX** | : | Anxiety |
| **WE** | : | Workflow Efficiency |
| **JS** | : | Job Satisfaction |
| **BI** | : | Behavioural Intention |
| **UB** | : | Usage Behaviour |
| **UAV** | : | Unmanned Ariel Vehicle |
| **GIS** | : | Geographical Information System |
| **VM/VMT:** | | Voluntary/Mandatory |
| **PPC** | : | Position/Rank |
| **PoW** | : | Place of Work |

# Chapter 1

# 1.Introduction

Change in organizational context is synonymous with reform. While any reform aims to bring in more efficiency, it also attracts resistance. Over the last few decades, technology has been at the forefront of organizational change leading to reforms in both the public and private sphere. Policing and law enforcement is one of the more important arms of governance to facilitate smooth governance and prevent any unrest and violence. The use of science precedes the use of technology in policing. Scientific procedures such as fingerprinting and blood sampling have been a part of policing for a long time. However, technology interventions have enabled digitization, digitalization, and transformation of manual procedures into automated and according to universal protocols. Conventional science and technology tools have prepared the base for using advanced science and technology tools. Along with conventional techniques, forensic techniques have also upended the probe, detection, and prevention of crimes.

Policing technologies can be broadly classified into two categories: Information and communication technologies (ICT) and Investigative Forensic Toolkit. While ICT is more pervasive in professional and personal spheres, the IFTK seems more evasive. The reason is that the country has limited forensic laboratory infrastructure, resulting in workload and investigation pendency. Consequently, police personnel tend to avoid using the more appropriate forensic toolkits. Moreover, lack of training, police personnel's education and experience, intrinsic motivation, and geographic location are a few of the many factors that may facilitate and hinder the use of scientific and technological tools. The legal compliances of the cases make the use of these tools more complicated.

Information and communication technology is an amalgamation of many artifacts including hardware, software, network, mobile, etc. It has immense potential to enable and facilitate the creation of new processes and workflows, facilitate new reporting structures, a span of control, local, regional, and beyond decision-making, flatter organization, etc. At the governance level, there are repercussions in making strategic decisions and policy-making regarding technology procurement, implementation, training, investment, capital expenditure, etc.

There are significant imperatives to using technology in policing. While criminals are prompt and ahead in using technology, police agencies are always playing the catching-up game. Modern means of telecommunications, electronics, data processing, and system analytics have the potential to exponentially raise the efficiency of workflows and outputs. There are certain skills and competencies that are akin to engagement with technology. Therefore, skill learning and upgradation become very important.

The use of technology is as old as civilization itself. Only the pace of technological developments has varied with time. Whereas in ancient and medieval times, the form and content of technology took centuries to evolve, in modern times, the pace has been rather extraordinary. The 18th and 19th centuries were marked by the Industrial Revolution, and the 20th century witnessed a proliferation of technological advancements in several fields, such as weaponry, means of transport and communication, the medical field, and the realm of forensic science. At the beginning of the 20th century, wireless and radio communication came into vogue. The use of radio, wireless and TV made the propagation of ideas, news and information available to the public quickly and easily. The last two decades of 20th century started witnessing rapid growth of internet and computer technology. The 21st century has rightly been called a century of information technology. The use of information technology has made the sharing and dissemination of information so easy, interesting and almost instantaneous. Governments and private enterprises

across the continents have enhanced the usage of technology in various spheres of governance. The infrastructure for setting up information system network and awareness programs are also being focused upon by governments and private players alike.

## 1.1. Technology and Society: An Overview

From historical times and even before that mankind has used technology in some form or the other. In the prehistoric era, people developed tools for hunting and dwelling. At the very outset, it would be pertinent to elucidate the broad connotation of police, policing, and technology. According to Encyclopedia Britannica, " the activity of policing, preceded the creation of the police as a distinct body by thousands of years. Technology refers to the application of scientific knowledge to the practical aims of human life or , as it is sometimes phrased, to the change and manipulation of the human environment. Humans can innovate and consciously modify the environment in a way no other species have achieved. By virtue of humanity's nature as a tool maker, humans have been technologist from the beginning, and the history of technology encompasses the whole evolution of human kind."

In recent decades, technology has penetrated every sphere of life in all its flavors and sizes. Beyond the turn of the century, technology artifacts have literally trespassed the personal and physical bubble of users. Consequently, not only connectedness and continuous communication have been facilitated as functions of human entanglements with technology; these entanglements have brought new kinds of dysfunctions. These dysfunctions manifest themselves in numerous forms, the most obvious being the crimes and violations of the penal code of conduct. As an imperative, it becomes important to assimilate and understand the functions of technology entanglements of users from the users' use, usage, and behavioral aspects. Technology adoption behavior is the academic and research domain that facilitates the understanding of how users

engage with technology. It helps understand the factors that drive the user's motivation to engage with technology.

Historically, the violators of the penal code have raced against the pursuing law enforcement agencies by innovating their modus Operandi, and more recently, they have misused information and communication technology to stay ahead (Worrall & Schmalleger, 2013). At the same time, the expectations from police agencies were not only to solve and prevent crimes but also to do it without violating the freedom and privacy of the citizens (Stainslas, 2014). Moreover, with increasing penetration and institutional initiatives through e-governance, stakeholders are also increasing their readiness to engage with ICT. This readiness if driven by various purposes.

Technology engagement of the users, in this case police personnel, is driven or hindered by many factors. The degree of technology infrastructure development in urban and rural geographies is varied and impacts engagement. Similarly, the user's educational qualifications and the in-service training play an important role in whether the police personnel will be motivated enough to engage with technology in an effective and nuanced fashion.

In the Indian context, with its' large population, the number of policemen always remains less per thousand citizens, leading to an overload of work. This consequently leads to high pendency and inefficiency. Eventually, serving justice becomes difficult and ineffective. Moreover, issues like accountability, transparency, legal aspects, and the cost of policing and solving crimes compound the policing processes (Razdha, 2017). Technology, in general, and ICT, is a potential instrument that can address many of these challenges.

ICT-based data analytics can be vital in highlighting crime patterns in terms of demographics and geographies. ICT-based data analytics will also help real-time access of information for tracing, tracking, and monitoring crimes. Since the engagement of the general public on new media such as social media leaves a digital footprint, the identification of the

electronic identity of people can be traced, eventually helping in crime detection and prevention. Apart from this, with a large workforce segregated into state cadres, human resource management can be planned and implemented, enabling optimum utilization of human resources.

Since information and communication technology artifacts are essentially platforms for communication and dissemination of information, ICT has the potential to create an effective interface for police agencies and public engagement.

## 1.2. Technology Use in Policing

Police technology subsumes not only all the equipment and tools used in policing, but also a variety of scientific and technological methods and techniques that are taken recourse to, for prevention and detection of crime and also for other police related work. According to encyclopedia Britannica "Police technology was recognized as a distinct academic and scientific discipline in the 1960s, and since then a growing body of professional literature, educational programs, workshops, seminars and international conferences has been devoted to the technological aspects of police work". (Encyclopedia Britannica)

Ancient and medieval times of our civilization witnessed early use of technology. For example, portrait of individuals were described in terms of words by ancient Egyptians. In modern time we refer to this concept as 'portrait parle'. The ancient Babylonians are known to have pressed fingerprints into clay to identify the author of cuneiform writings and to ward off forgery.

There is a positive co-relation between the economic well-being of a country and the level of technology used. The more developed and richer a country is, the more advanced technology it will tend to have. Police technology is also determined by factors such as geography and the socio-political milieu in which police operates. Thus, it has been observed that metropolitan and urban policing generally have greater reliance on technology compared to small town and rural policing.

The formative ideologies of a police force stemmed from the philosophical movement of modern Europe. On the one hand philosopher such as Descartes and Leibnitz stressed upon the importance of reason and logic in pursuit of intellectual knowledge, the philosophers such as John Locke, Berkeley and David Hume laid emphasis on the role of empirical experience in gaining knowledge. The rationalistic and empirical schools of thought marked the intellectual environment of 16th & 17th centuries of European history. Both these centuries witnessed the development and growth of mathematics and science, especially physics, which was called natural philosophy during those days. Newton's monumental work "Philosophiae Naturalis Principia Mathematica" brought about a revolution in science and provided foundations for classical mechanics. The intellectual ferment of the era popularly known as the 'Age of Enlightenment' paved the way for the Industrial Revolution and the growth of astronomy.

To examine the history of police and policing, it would be appropriate to look into the regional and global perspectives of policing over the ages. Technology began encompassing all walks of life, including police and military organizations. The invention of the radio and the rapid growth of modes of modernized transportation increased the mobility of people and ideas significantly. The growth of technology, especially wireless and radio, facilitated the functioning of security forces and the intelligence community and, in the process, proliferated various methods of secret communication and espionage. The military and police have recently increased their reliance on encrypted communications. The average policeman started learning how to operate wireless sets and got acquainted with motorized patrolling systems.

The last two decades of 20th century have proved to be quite significant from the stand point of police technology. With the advent of technologies like Internet, GPS, UAVs and DNA finger printing there has been a quantum jump in communication speeds and analysis. The aim of this study is to explore the interlinkages of technology, different designs, their perceived usefulness, and human attitudes towards the adoption, the assimilation and acceptance in day today

working and functioning of the Rajasthan police force. Let us, first, present a brief historical perspective on the beginning and gradual evolution of police in India and at the global level.

## 1.3. Historical perspective on policing- Global and Indian perspective

The first organized use of police may be traced to Ancient Greece in the beginning of 400bc. The city-state of Athens started using a group of 300 Scythian slaves to guard the public meetings and to maintain the law and order. The Scythian slave acted under the direction of eleven elected Athenian magistrates. There is cogent archaeological evidence to prove that these rudimentary police force used horse whips with wooden handles.

In Roman history the credit for organizing a strong police force goes to emperor Augustus. The brigades of police called cohorts were assisted by praetorian guards. Later on in the continent of Europe. France became the first state to create a police structure broadly on modern lines. Under the order of French emperor Louis XIV, Nicholas, De La Reynie was appointed as the lieutenant general of police of Paris. Before the creation of this post, the policing of Paris City was entrusted to 4 different police forces. De La Reynie established unity of command and brought about a drastic improvement in the maintenance of law and order. He was also instrumental in introducing street lighting in the city of Paris. In matters of state security the lieutenant general of police used to report directly to the Emperor.

*Mauryan Empire:* Both Kautilya's Artha Shastra and Indica by Megasthanes attest to an elaborate system of security apparatus and spy network. The Institution of spies has been described in chapter 11 of Artha Shastra as follows "assisted by the council of his ministers tried under espionage, the king shell proceeds to create spies — spies under the guise of a fraudulent disciple, a recluse, a householder, a merchant, an ascetic practicing austerity, a prisoner, and a mendicant woman" (source: Artha Shastra, an English translation by R Shyama Shastri). All the modern concepts of espionage, counter-espionage, use of deceit, and deception are mentioned in Artha

Shastra. The state was supposed to make special endeavors for imparting proper training to these spies in the art of disguise and deception. The network of spies used to inform the decision makers about the prevailing public opinion and the phenomenon of discontentment. There were two types of spies' stationary spies and wondering Spies. double agents were also recruited in enemy territories and efforts were made to mound the public opinion in various disguises before launching military campaigns. Artha Sastra also mentions about Dunda Neeti (crime and punishment). The king has to hold the scepter in order to bring his people under control. Kautilya further lays down that Punishment should be awarded due consideration. If punishment is awarded under the influence of greed and anger it may give rise to feeling of resentment and fury among householders and ascetic alike. Thus, the system of crime and due punishment is a sine qanoon of a just society and well administered state. Heads of Garrison forces (Durgpals) used to take care of security of their respective areas. Temporary military camps were erected in border areas for security reasons known as Skandhawars. It is also interesting to note that the modern concept of VIP security are to be found in Artha Shastra. For example, it mentioned that food to be served to King should be tested before.

*Sun Tzu: The Art of War:* The Art of War is a monumental work by Chinese military strategist Sun Tzu. Sun Tzu is said to have flourished during the late spring and autumn period. The classic treatise dwells at length on various strategies and tactics of warfare, business tactics, and legal strategy. The book also stresses the important role played by intelligence operatives and espionage networks. It is said that even Mao tse-tung was inspired by this great book and put the concepts to practical use in various guerrilla warfare campaigns.

*Mughal period:* The system of policing during the Mogul Empire was centered around three main institutions Subahdar, Fauzdar and Kotwal. Subahdar was responsible for the maintenance of law and order in the entire length and breadth of the Suba. The Subas were divided into sarkars, which roughly corresponded to modern-day Commissionerates. The institution of

Faujdar was set up at each Sarkar. It was the duty of Faujdar to keep pace and maintain law and order in his area. Faujdar used to maintain a contingent of armed personnel for this purpose. Kotwalis were set up in big urban centers such as the capitals of Subas and Sarkars. Important trade centers also had Kotwalis. The head of Kotwali police was Kotwal. The duties of Kotwal have been described in details in the Ain-I- Akabari by Abul Fazal. The duties of Kotwal included not only the security and safety of city dwellers but also the maintenance of social discipline and general cleanliness of the city area. He was also supposed to maintain a register of dwelling houses, the names of dwellers, and details of public utilities such as roads. He would also keep eye on the income and expenditure of city dwellers through a system of spies. The Kotwal also wielded the powers of a magistrate, which empowered him to oversee markets and prices and regulate animal slaughter.

*Policing during British period:* Initially the East India Company allowed the old Mughal police system to continue. The rural police was left at the mercy of zamindar. The watch and ward staff maintained a semblance of security in the rural areas. Zamindars used to exercise control over them. The old Mughal system of Fauzdaar, Kotwal and Daroga was not able to put effective control over crime and criminals. Therefore the British took control of the policing duties. During the time of Lord Cornwallis , the district were policed through "Thanas" which were headed by Daroga and equipped with lockups and small armories'. Though the Daroga and Thana system was found to be useful for some time, ultimately it was found to be deficient on many counts, such as, poor morale, lack of equipment and manpower. The first professional and modern police force was organized in the province of Sindh (1843). After the annexation of Sindh to British empire the need for establishing effective police system arose to control the marauding tribes and also the errant and disloyal Sindhi Amirs who posed the challenge of rebellion. Sir Charles Napier, who was appointed the first governor of Sindh was essentially a military man who had distinguished himself during the peninsular war in Napoleonic era. He modelled the police force with clear

command structure, insignia and uniform. In broad terms this professional police force was quasi military in character and appeared to be fashioned after the Royal Irish constabulary.

The tumultuous events of 1857 revolts paved the way for the end of East India Company rule and transfer of the reigns of the governance and sovereignty to the British Crown in 1858. In August 1860 the British government setup the first police commission to mull over and submit recommendations for establishing a new police system in British India. The police Act of 1861 provided for the constitution of a police force in a state. The administration of the entire police force was vested in an officer designated as Inspector General of Police who was to be assisted by Deputy Inspector Generals of Police, who were in-charges of their respective ranges. The administration of district police was vested in District Superintendent of Police, who was to be assisted by Assistant superintendent of Police.

*Growth of Police forensic in India :* During the later half of 19th century India started taking small steps in applying science and technology in the arena of Police forensics. The first chemical examiners laboratory was established in Madras (1849). Following years witnessed setting up of chemical laboratories at Calcutta (1853), Agra (1864) and Bombay (1870). Bertillon's Anthropometric System was invented in 1878 which made the task of criminal identification easier. Not lagging behind Indian police started maintaining anthropometric records of criminals and anthropometric bureau came to be setup at Calcutta (1892). Likewise at the initiative of William Herschel, who was a civil servant, police started the system of taking thumb impressions since 1891. This scientific method of identifying a criminal by matching fingerprint was used for the first time to crack a murder case in colonial Bengal (100 years of forensic science in India by Saumtra Basu). In similar manner new institutions of different branches of forensic science came in existence in various parts of the country such as, Handwriting examining institute at Shimla, Chief inspector of explosive at Nagpur. The serology department was formed in the year 1910. The gradual evolution of the forensic facilities proved to be of great value to the police investigators who could adduce cogent scientific evidence in consonance with legal norms.

***Policing In Britain:*** The First indication of police service in UK came in the form of The Bow Street Runners, who were utilized for serving writs or arresting offenders under the authority of magisterial order . Robert Peel is considered to be the architect of first organized English police service. Robert Peel as Home Secretary introduced the Metropolitan Police Act in 1829. In later years Law Enforcement agencies developed in a decentralized manner. In 1856 a law was enacted that each county will have its own constabulary. As of today United Kingdom has got 48 police services.

The basic philosophy guiding the police system in UK is that police can succeed in curbing crime only by seeking public support and approval. British policing is a perfect model of "policing by consent." All investigative officers of the British police force begin their career on Patrol beat. Generally, policemen and women in UK do not carry arms. Although police officers have wide ranging powers, they are still reckoned as members of the public who can be subjected to law as ordinary citizens in case of any infringement. It is also interesting to know that police in UK is held accountable to the local authorities. For example, the city of London corporation has got the authority to oversee the functioning of the city of London police. The similar system of accountability obtains in other counties and boroughs. Members of armed police contingent are authorized to carry various types of weapons such as Carbine ,Baton Guns and shotguns . Side arm is carried by all officers. Bobbies (police personnel) are encouraged not to use deadly force but to make use of non-lethal weapons such as Tasers.

***Policing in USA:*** The modern form of policing started evolving in America in the first half of the 19th century. However, a rudimentary beginning in the form of night watch took place almost two centuries earlier. The night watch was constituted by hiring

volunteers on payment basis. These paid volunteers were neither bound by any departmental rules or procedures nor did they get any training. In fact, in many instances criminals were used as watchmen who would sleep and drink on duty. The cities of Boston and New York employed the practice of night watch in 1630s and 1650s respectively. Only the wealthy and rich people could afford to hire these night watches.

*Australian Police:* The earliest civilian police force in Australia came into being as Night watch (1789). Later on all watch teams were combined to constitute a new organization named as NSW Police Force with its charter of Sydney town. In similar manner police structure in other states were formed. In Australia law enforcement in agencies work at three levels- Federal, state and local. Australian Federal Police (AFP) was formed on 19 October 1989 by merging three separate law enforcement agencies. The charter of duties with respect to AFP has got a huge range. It includes not only organized crime and terrorism , but also economic crimes, financial frauds, child exploitation and community policing. Australian Federal police also has the responsibility to trace and control transnational organized crime and work as a member of INTERPOL. The six states in Australia as well as the Northern Territory have their own police organization. The state and territory police deal with the crime in their respective areas, in Australia, the state legislators have got the power to choose the commissioner or chief of police from senior police ranks. The police chief is Directly responsible to the cabinet minister.

*Japan :* The modern police system in Japan owes its origin to Toshiyoshi Kawaji, the first Superintendent General of Japan. Based on his study of police systems in European countries, he founded the Tokyo Metropolitan Police Department which was placed under the Ministry of Home Affairs. On the level of prefect, the Police Departments functioned under the executive supervision of the governors who were appointed by the Central Government. So in a way prefectural police

department perform the law enforcement duties subject to the control and supervision of the Governor.

Following the Japanese defeat in world war – II (1945), Japanese government started the process of democratizing the police system of Japan. The National Public Safety Commission was constituted. It was headed by Prime Minister of Japan who appointed members of the said commission. In similar manner, the Public Safety Commission were established to oversee the functioning of prefectural police departments. At the local level the cities, towns or villages have their own forces with the supervisory power vested in respective Public Safety Commission. Japanese Police at all levels is well provided in terms of vehicles and equipment. The police vehicles made available to police stations, police boxes (Koban), and residential police boxes (Chuzaisho) made over the throughout Japan total approximately 42600. Since Japan is a country of islands and lakes, police boats are used to patrol around ports and remote islands. Japanese police forces are also equipped with helicopters (approximately 80). The helicopters are pressed into service for rescue and disaster relief operations and also for surveillance over traffic and pursuit of dreaded criminals/suspects.

Information System of police in Japan is in digitalized form. The crime related data storage and the dissemination of data and information from basic unit to prefect and National Police Headquarters is ensured through a network of computers and related hardware/software. The support services like digital forensic are quite advanced.

The most unique feature of Japan Police is the system of police boxes known as Koban which play a pivotal role in fostering bond and co-operation between community and police officers. The support and co-operation of the local residents is solicited in the area of crime prevention. The police officers of these police boxes making visit to homes and work places of the

local citizens is a very routine affair. Such close ties of Kobans with community tend to build firm foundation of public trust.
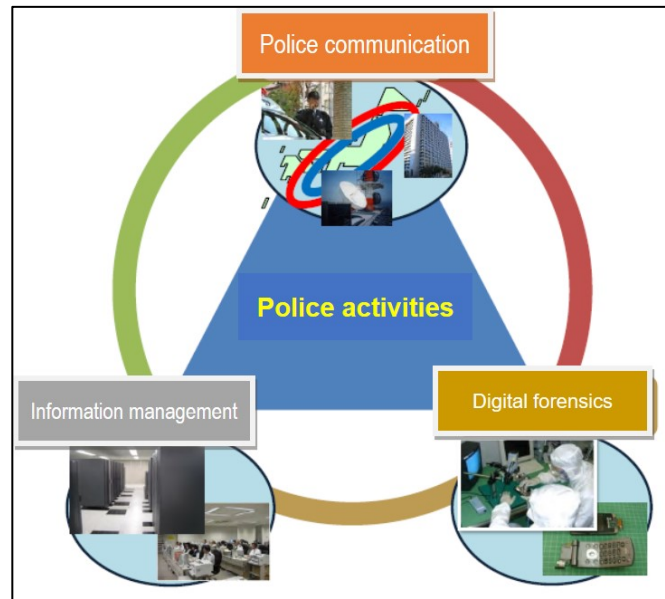


*Figure 1 Japanese Koban System Framework*

***Beginning of Modern Police:*** New York City was the first city in US to setup a formal police department in 1845 to be followed by New Orleans (1852), Boston and Philadelphia (1854) and Chicago 1855. These police departments looked upon and Metropolitan police of London. The Charter of Duties laid emphasis on the prevention of crime and control over lawlessness. Detection and investigation of crime was neglected. Policing in the latter half of the 19th century got highly politicized. The captains, sergeants and even police chiefs were picked up by local political leaders who exercised control over the functioning of police to suit their own selfish partisan interests. After the First World War, police leadership in the USA started making serious endeavors to convert police into a professional force. A lot of emphasis was placed on the adoption of new technologies and regroup training of police personnel. Efforts were also made to curb corruption by attaching due regard to merit and fairness in the recruitment and promotions of police personnel.

## 1.4. Technology Integration and Penetration in twentieth and twenty-first century

Evolution of police technology Communication: When the police system was formalized in European countries, such as Austria, Prussia, France, and the UK, during the 17th and 18th centuries, the basic mode of communication among police personnel was face-to-face communication. They also used Rattle and whistle to alert people and seek public assistance while affecting arrest. The subordinate staff took instructions from their senior officers face-to-face or in written form. As the police beats grew in terms of area and expanse, face to face communication and written communication needed to be supplemented for better command and control of police. By the mid of 19th century telegraph had been invented. As the use of telegraph through the medium of electromagnetic wires increased, communication was made much easier and efficient. Police organisations ,military and other departments started adopting the new technology . With invention of telephone, the communication system of police got a philip in 1880s onwards not only in USA, but in almost entire Europe and some Asian countries including India and Japan. The year 1896 witnessed a revolutionary invention in the area of communication - radio or wireless telegraphy. The invention by Marconi laid the foundation for systematic development of radio transmission. Among the police departments of USA, Detroit police was the pioneer in use of technology for enhancing police efficiency.  New York police had also started making use of one -way radio receiver placed in patrol cars from 1917 onwards to transmit massages and instructions to its officers. New Jersey police took the initiative of introducing two-way radio receivers in patrol cars and command centre (1933). The Two-way radio communication soon received wide acceptance throughout the US . Eventually police department across continents adopted this immensely useful tool of communication technology. In two-way radios , voice or data is converted into radio waves and transmitted via an antenna. Apart from mobile radios which were installed in patrol cars , hand held portable radios were also made use of by individual police personnel which greatly facilitated the radio contact between the patrol officers and the dispatch

centre. Later on radio was adopted as command and control tool for enforcement of traffic law and regulation of traffic flow (1948 onwards).

Several technological advancements led to the institution of systematic efforts aiming at improvement and facilitation of communication between the police units and headquarter on one hand and the police units and the citizenry on other the hand. The start of police telephones was made in year 1877 in Albany, New York. The five districts got connected to the mayor's office through newly installed telephone system. Similarly, United Kingdom witnessed the first use of telephone by police for connecting with other units in 1880. All the police stations and fire stations of Glasgow were connected through an emergency phone system in 1886. Setting up the police call -boxes proved to be a very useful means of communication between patrol units , police stations and common people. By the end of 19th century call -boxes were been extensively used in USA,UK and other western countries.

***Role of computers :*** The advent of computers brought about revolutionary changes in many fields, including communication. Saint Louis Police department is credited with the creation and setting up of the first computer despatching system(1955). National crime information Centre was founded by FBI (1967) for maintaining computerised database pertaining to criminals, fugitives , missing persons and stolen properties. By the end of 20th century , New York City police and police departments of other US cities and states has started using computer programs not only for crime analysis or mapping but also for collection collation and dissemination of criminal intelligence . Similarly European Union is also presently maintaining a computerised network of information and data. Member states can avail of the enormous volume of digital information data relating to crime and criminals. Computer assisted dispatch (CAD) or now a common and essential feature of contemporary policing worldwide. The CADs not only attend to

the emergencies (as in 9/11 system in US or 112 system in India) but also help in building databases on the incidents and caller identities and addresses etc. The CADs also reveal the connection between the past and the present cases. Law enforcement agencies, including police department in India are making use of computers and social media analytic tools for gathering intelligence on various aspects such as public mood on an issue, potential communal tensions and law and order disruptions. There are umpteen cases of crimes in which police was able to trace important clues through social media analysis . Thus the use and role of computers in prevention as well as detection of crime will surely increase in days and years to come.

*Uniform and Personal Equipments:* Police uniforms were shaped and designed in conformity with the organisational objectives and the socio-political norms of the era. During the 19th century police uniform was militaristic in pattern in US and also in several countries of continental Europe. The surplus uniforms from the union Army following the end of civil war were , by American law provided to enforcement agencies as standard police uniform. in UK in the 1800, police personnel donned a blue coat and trousers ,black top hat and scarlet waistcoat. During 19 century, police personnel, working in field carry basic equipments – a stick, handcuffs, and a fire arm , (either a pistol or a hand gun). The gun was attached to Sam brown belt – well designed by Sir Samuel James Brown - an officer of the British Indian Army. The use of Sam brown belt has declined in the western countries but it is still used by police in India specially on ceremonial occasions. In the later half of the 20th century, the personal equipments to be carried by the uniformed officers have increased in number. The item include ,automatic pistol with ammunition clips , handcuffs-metallic or plastic, a portable radio, a collapsible baton. The police officers deployed in emergency prone areas or undertaking anti terrorist operations invariably wield bullet resistant vests to protect their torso.Kevlar fibre and ceramic and fibre combinations are used in the manufacture of bullet resistant vest.

*Other weaponry:* Both Military as well as Police in US had to depend on single shot weapons prior to the Civil War. These weapons were bulky and heavy, their large size was necessitated by the amount of gun powder and size of projectiles. Gradually, flintlock / single shot pistol were replaced by muzzle loading revolver. Samuel colt started the assembly line process to manufacture, firearms and was instrumental in mass production of pistols. Cold pistols set a standard by which other arms were measured till the middle of 19th century. Afterward, the Henry Repeating Rifle 1860 and the Coal single-action Army Revolver 1873 were developed. These weapons used self-contained cartridges, which was a major advancement. Advancement in the mechanism, the bullet and the powders led to highly effective hand guns for police and such as Smith and Wesson model (.357 magnum) developed in 1935 which along with.38 Revolvers continue to serve even today. Rifles of varying calibre came to be used in US and some other countries post-1920s. Thompson or Tommy submachineguns were also popular with police units dealing with organized underground gangs. During British rule in India,state police by and large depended on musket .410 bore. After the Indo -China war in 1962, .303 rifles (Lee Enfield. Rifle) were phased out from Army and provided to state police forces . These rugged rifles which were sturdy and accurate in firing remained the mainstay of Indian police. But now the single shot rifles have been mostly phased out and replaced by modern weapons such as 5.5 6 mm INSAS and 7.62 mm SLAR and 7.62 mm AK series rifles. Sten gun 9mm , old Carbine 9mm have given way to MP.5 submachine gun and Glock pistols have replaced old Webley Scott .455 pistols . Since late 20th century, there is an increasing trend in police department across countries to substitute pump action shotgun by semi automatic shotguns.

*Nonlethal weapons:* Nonlethal weapons are so designed and are made up of such stuff that they tend to incapacitate the target person with minimum fatalities or permanent injury. Tear gas, plastic bullets, Tasers, pepper sprays, water cannons are examples of conventional nonlethal

weapons. Nonlethal weapons are also termed as less lethal weapon . The Taser is by far one of the most preferred less- lethal options for police and other law enforcement agencies in US,UK and many other western countries. According to a report of Reuters, almost 90% of the law enforcement agencies in the US have adopted Taser as an effective tool during the course of policing and law enforcement. Taser is not considered a firearm. The latest version of Taser has a unique feature that records the date , time and duration of the electric shock. This added feature shields the officer from frivolous and concocted allegations. Indian security forces and police have been using these for years.

*Use of chemical agents :* Various chemical agents have been developed and adopted by police for crowd control and riot control. Pepper spray is used to cause irritation and burning sensation in eyes . The target(subject) experiences temporary blindness and, in the process, is restrained from creating law order problems. The chemicals used most commonly are CN Gas (2-chloroacetophenon), CS Gas (0- chlorobenzylidene malononitrile), OC(oleoresin capsicum), PAVA(pelargonic vanillyl amide).

*Anthropometry ,Fingerprinting and Dactyloscopy :* The beginning of forensic science and forensic laid emphasis on noting down minute details while conducting autopsy. He also observed that the presence of water in lungs is an indication of death by drowning. French professor Mathew Orifila , an expert of medicinal chemistry is credited with making the use of microscope to assess blood and semen stains. Alphonse Bertillon , a French biometric researcher cum police officer is considered the father of anthropometry. In 1889 he came up with a system of identification through physical measurement in conjunction with photography. The Bertillon system had inherent flaws mainly due to lack of accuracy. But biometrics as a method of identification with the help of computers is now a days popular. Edmond Locard furnished a solid foundation for the growth of forensic science by his famous "exchange principle" which states that every criminal in some way, leaves behind trace of his or her crime on the crime -scene. If

evidence is collected from the scene is the scientific and methodological manner and sent to forensic laboratories for test and analysis by forensic experts, the resulting scientific evidence may be adduced in court of law as incontrovertible proof. Locard is credited with setting up the first police crime laboratory in 1910 in French city, Lyon. Dusting and chemical techniques are used to develop the traces or latent fingerprints.

*DNA Fingerprinting :* DNA fingerprinting is an important advancement in the forensics. It is a scientific method to study and determine the sequence of nucleotides in DNA of an organism and for the purpose of identification to compare it to that of others. DNA fingerprinting has got immense importance and use in forensics. The DNA extracted from blood, hair, semen, saliva or any other body tissue is subjected to analysis. The resulting DNA profiles for compare to the molecular (genetic) fingerprints of suspects to ascertain match and identity.

*Digital forensics:* Digital forensics refers to the practice of storing, analysing and retrieving electronic data for the purpose of investigation relating to an electronic device. Electronic evidences is a component of almost all criminal activities and digital forensics support is crucial for law enforcement investigations. Digital forensics and information security, go hand-in-hand.

*Lie Detectors:* Polygraphs, popularly known as lie detectors were developed in the 1920s, as a scientific aid to investigations. The underlying principle is that there are measurable physical indicators which can be recorded through sensors in case a person is lying.

*Advancements in preventive policing Surveillance equipment:* CCTV are the most widely used means of keeping surveillance over public and private space to prevent crime and

terrorism. Close circuit television ( CCTV) system is constituted by video cameras ,display device and data networks. According to an estimate, there are around 5.2 million CCTV cameras in the UK. The top five countries in terms of installed CCTV cameras are— China, UK, US, Germany, and Japan. Sometimes CCTV cameras are installed in the patrol cars that not only record the events but also technically monitor the conduct of police officers. Traffic violations are also captured by CCTV.

*Thermal imaging:* Advancement in technology have resulted in powerful Binoculars with the magnification and light gathering power. Both -hand held binoculars and those fixed on tripods are used by security forces, especially border guarding forces (BSF in India).

*Eavesdropping:* Law enforcement agencies take recourse to audio- surveillance through electronic interception of conversation. There is a legal framework which permits wire tapping of telephonic as well as telegraphic communication.

*Facial Recognition Technology* :One of the emerging police technologies is Facial recognition technology which uses a biometric tool to match a human face from digital image. Thus the use of facial recognition software reveals and confirms identity of a subject or suspect. However, it is considered to be less accurate than fingerprinting.

*Voice technology:* The latest innovation introduced in patrol cars is voice command technology. Multi tracking is made possible through this technology. Commands can be given to run a license plate or turn on a Siren. This technology also facilitates filling of reports from the spot. The patrol officers can dictate notes while driving.

*Artificial intelligence and machine learning:* US scientists are developing mathematical models and algorithms to detect gunshots, determine shot to shot timings based on the analysis of gunshot recordings and the scene geometry. AI is also used in the area of predictive policing.Voluminous data kept in the crime and criminal related records can be analysed to sort out and predict possible criminal recidivism .Data could also be subjected to pattern analysis for

the purpose of disrupting, degrading and prosecuting crimes and criminal syndicates. Using artificial intelligence cameras are enabled to identify vehicles and their drivers. This is one of the many uses of computer vision.

*Robots for law enforcement:* Artificial intelligence powered robots are being used in different parts of the world . The robotic police are designed to reach inaccessible areas or risky situations for law enforcing personnel. Robots are equipped with sensors and communication, gadgetry in such a manner that they acquire capabilities to manipulate objects, deal with the hazardous situation and gather information. The San Francisco police has been authorised by the council to use robots (2023).

*Body Worn Cameras:* Body worn Cameras have added another dimension to police technology innovations of the 21st century. The prevalence of the use of cameras is discernible in developed countries, such as US and UK. India and other Asian countries are also adopting this technology. Many state police organisations in India including Rajasthan have acquired this novel technical equipment. These cameras are useful for the police personnel who during the course of performing their duties come into direct contact with members of public. Body-worn video cameras are small devices that are put on police personnel's uniforms on the front side. While officers attend to all incidents, the devices are turned on to record audio and visual evidence.

*Drones:* The use of unmanned aerial vehicles by police and law enforcement agencies has grown manifold in the last decade. UAVs or drones that are used for public safety and law enforcement are generally equipped with aerial view, 3-D mapping, and thermal imaging systems. Drones can be put to various type of uses: crime scene, documentation, swat operations, assisting relief operation in disaster situations and most important, crowd management and traffic pattern

review. Drones can also contribute significantly to strengthen investigation and prosecution. The digital data captured and stored by the drones can yield information about the criminals involved. Various state police departments across India have started harnessing drones for enhancing efficacy and effectiveness of police. The Haryana police resorted to tear gas shells drop from drones to disperse the protesting farmers who were trying to break through the Shambhu barrier on the Haryana – Punjab boundary.

*Police mobility:* In the beginning of 19 century, police officers and constables patrolled their beats (demarcated areas of responsibility) on foot and also on horseback. In the late 1800s, the mass production of bicycles and ushering in of the so called golden age of bicycles paved the way for organising bicycle patrol. Patrolling by cycle became especially popular in dense urban areas and cities of Europe and US. By the start of 20th century police departments in US adopted horse drawn wooden wagon as patrol vehicle . The breakthrough in police patrol system came with the invention of internal combustion engine and advent of automobiles technology. The first automobile police patrol wagon is reported to have been deployed and used in the city of Akron Ohio in the year 1899. The wagon was powered by a battery. The use of automobile patrol cars gained currency during 1930s and onwards gradually overshadowing motor cycles, which had been a popular mode of police mobility and transportation since 1910 -11.

## 1.5. Information and Communication Technology

The world is so interconnected and interdependent due to the all-pervasive use of the internet and digital technology that the 'global village' concept appears to be a reality. In fact, it is almost inconceivable to think of any sector or sphere of life that is bereft of ICT. The ICT may denote a set of technological gadgets and modalities used for transmitting, storing, creating, and exchanging data or information. ICT denotes and encompasses various technical processes such as

recorded broadcasting (podcasting video & audio players and storage devices) and live broadcasting (radio, television & webcasting). The ICT includes relevant resources such as computers, the internet, smartphones, etc. Websites, e-mails & blogs today constitute the most efficient channel of communication.

In India, the ICT sector is progressing at a very good pace. Today ICT sector and digital economy account for 13% of GDP. According to an estimate the IT enabled services, hardware & software products, and e-commerce recorded double digit growth in 2022. According to the International Trade Administration, "The Indian telecommunication sector is the largest in the world by subscribers, with 1.2 billion wireless and fixed-line subscribers. India's mobile economy has been driven by widespread adoption, with wireless subscriptions representing 98% of telephone use".(Source; Official website of The International Trade Association, dated 12.01.2024.)

## 1.6 Investigation Forensic Toolkit

Criminal investigation is carried out using very rigid police procedures. As soon as a crime is reported, the site of the crime is secured, and necessary protocols are followed. The investigating officer is supposed to gather evidence from the crime site without contamination as much as possible.  This requires the help of a specialized set of tools, which includes, amongst others, tools to pick fingerprints, blood samples, soil samples, physical artifact samples, photographs, ballistic investigation tools, fiber analysis tools, etc. Other elementary objects, such as poly bags and packs, knife cutters, packing material, tape, etc, are also a part of the forensic toolkit. All these tools may help the investigator understand how and where the crime was committed.  The tools may help establish relationships between people, objects, and spaces. Asen (2017) records that the first published literature on forensics is a book authored by a Chinese based on real incidents and

experiences of dealing with crimes. However, the seminal innovations in forensics happened from the late 16th century to the early 20th century, culminating in the form of digital forensics of the late 20th century and now in the 21$^{st}$ century. The emergence of information and communication technology, personal computers and supercomputers, telecommunications, and geo-informatics have catalyzed the forensic sciences discipline.

Investigation tool kits are an important element for conducting scientific investigations of crime. In India, as in other countries, police stations have been provided with investigation kits. A typical investigation tool kit contains a pen, measuring tape, caution tape, calculator, mask, gloves, clipboard, camera, blank incident investigation forms, and hazardous materials disposal bags. The district's MOB branches are equipped with tools & materials, including chemical powders to lift fingerprints and also take foot moulds. Generally, police station-level investigators lean upon regional FSLs or Modus Operandi Bureau for lifting and photographing traces in cases of heinous crimes or property-related crimes.

## 1.7. Technology Adoption

The aim of this study is to explore and understand the technology adoption behaviour of the personnel of Rajasthan Police with regard to the introduction and diffusion of new technologies specially in the arena of communication and information. An attempt has been made to see if there are any positive or negative co-relations among different variables with regard to adoption of a new technology. Are there any motivating and facilitating factors which lead to speedy and wide level acceptance of a particular technology? It has also been attempted to find out the emerging patterns in technology adoption in terms of area distribution. The study also touches upon the citizen-centric services the delivery of which has been made possible through the information technology.

An organization's effort to change the existing culture of work through interventions of information and communication technology may lead to technology innovations (Dias, 2000, p.52). This also results in cost-cut savings and process improvisations. Consequent to this is the competitive edge over others. Apart from this, optimized use of resources can also planned and implemented. Therefore, organizations' initiatives to inculcate technology into work culture help identify opportunities for efficiency and productivity (Mussi & Canuto, 2008). According to Farias, Guimarães, and Vargas (2012, p. 27), procedural innovations in organizations lead to changes in work culture. However, this does not necessarily lead to the innovation's adoption. Motta (2001) also suggested that the new media technologies have influenced organizational changes. These changes may be temporal or more permanent depending upon the degree of adoption by employees (Weick & Quinn, 1999).

Rogers (1983) postulated that technology adoption is a phase-based process and does not happen just by organizational penetration. Venkatesh et al. (2003) also opined that technology adoption must be explored from a wider perspective, including factors affecting individual and organizations adoption of information technologies and information systems. This observation can be substantiated by the fact that certain systems, such as ERP, are successfully adopted by employees and organizations, leading to organizational business advantage.

Technology can act as a tool to bring about behavioral change and a resource in itself to offer options to optimize other resources, thereby bringing in efficiency and productivity (Kelly, 2012, p. 42). Early research also treated technology usage in organizational context as strongly related to creation of new knowledge in terms pf new processes, ideas, know-how and new practices Zawislak (1994, p. 3). The author suggests that the phenomenon of technology is associated with

two elements: the technical and the logical. The logical analysis of the technical aspect conjugated with the social aspect can lead to higher and more efficient acceptance of the artifacts.

Further research in different contexts has shown that adopting enterprise-based technology leads to efficient decision-making (Laudon & Laudon, 2007; O'Brien, 2004; Moura, 2006). It can be inferred here that the availability of information and data, easy retrieval, and centralized storage have a significant role in faster and, therefore, efficient decision-making. Human resources drive organizational growth and development, and technology has the potential to act as a catalyst that not only boosts the capabilities of human resources but also provides exponential growth (Arthur, 2011; Mussi & Canuto, 2008).

When adopted by employees and organizations, technological innovations can bring about long-term positive change in organizations (Stal, 2007; Tigre, 2006). Weick and Quinn (1999) differentiate continuous change, which is cumulative, continuous, engaging, and emerging, from episodic change, which is abrupt, infrequent, discontinuous, and intentional. Adoption of information and Communication technology promotes structural efficiency and counter the barriers of organizational hierarchy (Graeml, 2000). This can be attributed to the typical characteristic of information and Communication technology which breaks down the apce-time barrier.

## 1.8. Policing Procedures with reference to ICT & IFTK

The introduction and use of ICT coupled with ITK (Investigation Tool Kit) has certainly made a positive impact on prevention and investigation of crime. The digital storage of data pertaining to criminals and convicts can be easily stored and retrieved to facilitate their tracking and if needed apprehension and arrest. The use of scientific investigation tools and assistance provided by forensic laboratory teams certainly enhance the objectivity, fairness and value of

investigation. The evidence collected through scientific methods play a crucial role in successful prosecution of cases in the court of law. It may also be noted that effective use of ICT has hugely contributed to the generation, collation and dissemination of criminal and tactical intelligence in real time. Recently Rajasthan Police has launched a system of passport verification by mobile phone (M-passport verification) which has drastically reduced the time consumed in the process.

***Crime and Criminal Tracking Network & Systems (CCTNS):*** In the latter half of the 1980s, the National Crime Record Bureau started working on a program to connect all 35 State and Union Territories to districts and police stations for collecting and compiling data & information pertaining to criminals and crimes. These initiatives – CCIS (Criminal and Crime Information System) and CIPA (Common Integrated Police Application) were launched in 1990 and 2005, respectively. However, both the programs were found to be wanting with respect to some technical aspects.

Therefore, the Ministry of Home Affairs sponsored a novel and more comprehensive project under the name, Crime and Criminal Tracking Network & Systems (CCTNS). This ambitious project which was launched in the year 2009 has been able to create a nationwide networked infrastructure to which all police stations of the country have been connected. Such a comprehensive and integrated system has vastly improved the functioning of police in all states and union territories. The huge database is readily available for planning predictive policing and also for crime analysis and criminal profiling. Certainly, the successful implementation of CCTNS has led to enhanced efficiency and effectiveness of police at the cutting-edge level (PS).
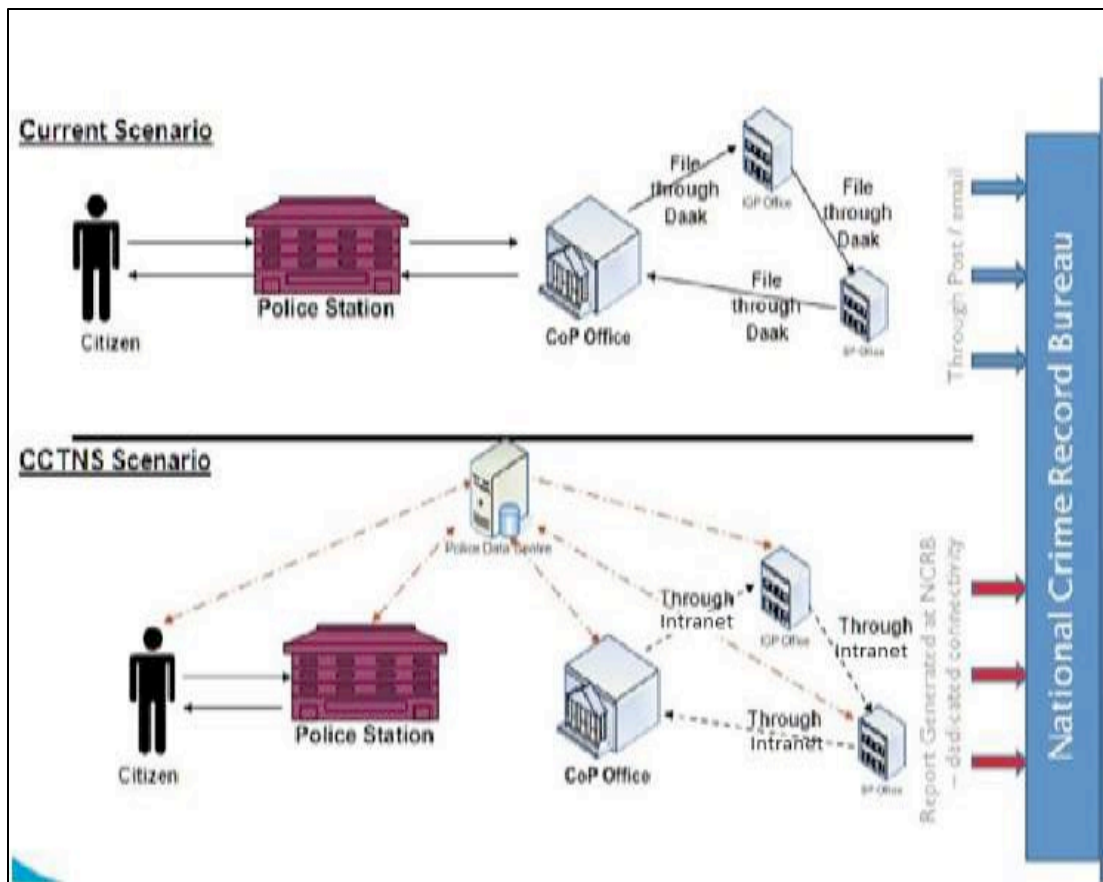
*Figure 2 Expected Change in Policing System with technology Use*

**Abhay Command Centre:** The Abhay Command Centre another vision for the Rajasthan Police Force acts as a hub that assembles security, control and management of different sub-systems on a single integrated platform to provide safety, security and timely assistance to the residents during the time of emergency. The command centre's data centre is the nodal point of consolidation of various points of information like video surveillance, CAD, traffic management, VTS, Cyber forensics. The implementation and integration of such tech finally aims at a smoother workflow and cutting down mundane repetitive tasks at the grassroots level.
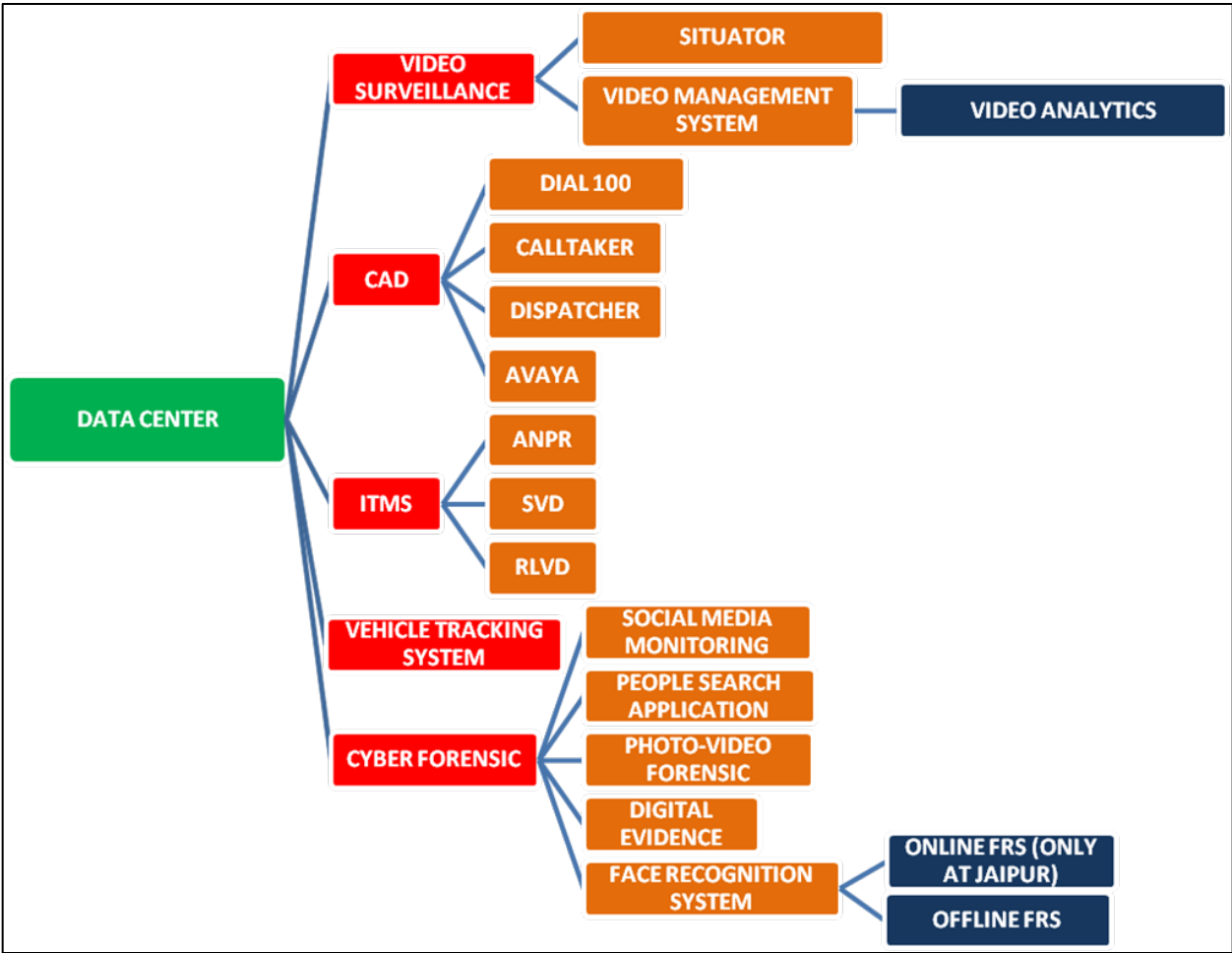
Various forms of information and communication technology tools and artifacts have been utilized in police forces across the globe. However, it remains to be understood why certain technologies are adopted and others are not in policing. There can be possible intrinsic and extrinsic factors associated with the adoption behavior of police personnel.

## 1.9. Research Rationale

The transformation of policing from a stick and handcuff-based brute force manpower to palmtop and mobile-based tech-savvy police personnel has been affected in the last three decades

across the globe. Before the advent of computers and the internet, the telephone and two-way radio revolutionized policing (Harris, 2007). After the turn of the century, powerful technological innovations, such as the internet, the World Wide Web, geographic information systems, and mobile technology, provided new avenues for policing to get better and more effective. It allowed for a seamless flow of information, huge storage of information, easy retrieval of data, and capabilities for handling multimedia data such as images.

However, all these affordances of technology are not enough to materialize its eventual usage. This is because there is a human being operating behind these technological artifacts. Human behavior is very complex and is driven by intrinsic and extrinsic factors. Moreover, in the context of a country like India, which is geographically and demographically very diverse, it becomes a challenge in itself to implement a technology intervention in a public organization. Weiss (1997) opines that police personnel have unique and varied identities shaped by organizations culture, philosophy and goals.

Existing research has focused on the uses and interventions of technology, mainly information and communication technology. However, there is a need to go beyond this locus of attention. People are very important in terms of their behaviour when using technology. The police workforce is comprised of human resources personnel who are a mix of digital natives and digital immigrants. It is, therefore, imperative that their technology adoption behavior will vary. These differences are driven by the characteristics of the technology artifact as well as the demographic profile of the users. It implies that the knowledge about socio-technical determinants and moderators of technology acceptance behavior can help deliver better usage, outcome, development, and policy practices in the police force.

## 1.10. Research Objectives

The research objectives for this study are as follows:

1. To explore the evolution of technology usage (ICT and IFTK) in Policing.

2. To find out the difference, if any, between demographic groups among Police personnel with respect to ICT Adoption, and to record the significance of the difference.

3. To find out the difference, if any, between demographic groups among Police personnel with respect to IFTK Adoption, and to record the significance of the difference.

4. To find out the difference, if any, between demographic groups and the Determinants of ICT Adoption among Police personnel and to record the significance of the difference.

5. To find out the difference, if any, between demographic groups and the Determinants of IFTK Adoption among Police personnel and to record the significance of the difference.

6. To comprehend the latent adoption behaviour(s) through discussion of quantitative results and qualitative analysis of narrative discourse gathered through interviews.

## 1.11. Summary

This chapter presents an overview of the thesis topic: technology adoption behavior among police personnel in Rajasthan. The scope of the topic of thesis demands an background insight of how technology has evolved over the last few centuries in general to the current context. It also presents an overview of the historical background of the evolution of policing in India as well as globally. The chapter delves into the aspects of technology and society, information and communication technology, technology adoption and policing and the rapid innovations in all pervasive internet based platforms which can be utilized for communication and information storage, retrieval and dissemination purposes. The chapter then lays out the objectives of the research work.

# Chapter 2

# 2.Literature Review

Technology, particularly internet-based technology, has seen exponential growth in the last two decades. What is more interesting is its penetration among the general population. The idea that juvenile criminals should be given tags that limit internet connections, as suggested recently in The Guardian newspaper (Usborne, 2017), emphasizes how much technology permeates every part of society. Higgins (2015) states that using body-worn cameras, crime mapping, and crime analysis are just a few of the technological advancements for law enforcement that are thought to be very promising.

Technologies are intricate, frequently varied means to a goal (Manning, 2008), having institutional implications (they carry out actions) as well as symbolic (they stand for something else). Interpersonal skills, sometimes known as conversation, are the main tool used in police. As a result, the concept of police technology is broad and inclusive rather than limited to "hard" technologies like apparatus. According to Hickman et al. (2011), several law enforcement agencies have employed heart-rate monitors to measure the stress levels of their personnel during incident response. Technology is frequently categorized to help understand how it works. Manning (2003) broke down police technology into five categories: communication, mobile, transformational, training, and analytical.

Police technology is now essential to police work, not something that should only be located in the administrative building's rear offices.  Police agencies today utilize a range of instruments, such as surveillance cameras, drones, computerized license plate scanners, face detection applications, body cams, and many other tools to prevent, respond to, and investigate crimes (Manning, 1992a; Orlikowski & Gash, 1994). More recently, in February of this year, Karen Hao, an artificial intelligence writer for the MIT Technology Review, reported that US

authorities are using fictitious data to train crime-predicting AI. That suggests that biassed AI was still used in police training, which exacerbates the issue even in light of growing knowledge of it.

A growing number of software, hardware, and communications networks are available to provide law enforcement and investigative capabilities to officers for use in the field; these networks are based on mobile systems —by G.A., Contra Costa Times, January 18, 2016. BWV cameras are used to record interactions between the public and law enforcement; they are only activated at this time of contact and people are informed that this will happen (Jameel and Bunn, 2015; Press Association, 2016).

This is because of worries about privacy and the volume of surveillance that is now in place in public spaces. They are not without drawbacks, though, as the debate about integrating technology advancements and applications into the English and Welsh police services makes clear. Individual rights and the volume of data gathered are the main concerns raised by the public concerning new legislation, new technologies, and how they are being utilised (Bellamy, 2011).

Scholars who examine how technology affects social interactions have long maintained that technology should not be understood to be limited to its physical, material components; rather, technology functions within social contexts, and individuals in various social and organisational contexts interpret its meaning in different ways (Ackroyd et al., 1992)). The development of several techniques has hindered access to targets, making crime extremely difficult to commit. These have been known as "focus on stiffening" in a literary and sometimes metaphorical sense, together with monitoring. (Grabosky, 1998).

Police officers' physical abilities to view, understand, recognize, analyze, and speak are all enhanced by policing technology (Koper & Lum, 2015). These technologies may include data

processing systems like computerized mapping or criminal analysis, forensic technology like DNA testing equipment or fingerprint readers.

Modern police organizations have been greatly impacted by technological advancements and inventions in a variety of ways. (Koper & Lum, 2015). Remember that the main police strategies during most of the 20th century were driven preventative patrol as well as quick reaction to service calls. These strategies were created in response to interference from radio communications for motor traffic and alerting methods assisted by computersc(Koper, Lum & Wills, 2014). Historically, law enforcement organisations have used the newest technology to enhance their operations (Koper et al. 2014). The corpus of excellent empirical research evaluating whether these developments boost the legitimacy, efficacy, or efficiency of the police is less substantial (Byrne and Marx 2011; Lum 2010).

The Karnataka State Police's flagship project, Police IT, aims to digitise every aspect of policing, from fundamental tasks like maintaining traffic patterns and crime prevention to more specialised duties like police motor transport and training. It also connects all of the department's locations, including police stations, sub-divisional offices, Circle offices, district offices, campus networks at COP, CID, Chief offices, and other special unit offices.The Delhi Police hopes to implement "technology-based policing" by 2020, including cutting-edge technologies such as self-learning systems, artificial intelligence, and smart policing.

Grabosky (1998) asserts that policing involves a quick integration of several data sources and a sophisticated synthesis of different processes with distinct social roles. The need of appropriate ICT design and use is increased by the delicate nature of the task and the requirement to produce results quickly. ICT systems encourage law enforcement to improve their skills. ICTs can vary from systems located in public spaces via PC-based systems in workplaces, to systems put in vehicles and mobile units. ICT ideas, architecture, and design have greatly evolved and are

35

subject to ongoing innovation. Mitra (2012) also points out that Improved monitoring and surveillance are the results of ICT, such as networked CCTV.

## 2.1. Technology and Policing

The Department of Police in India is generally and correctly held responsible for maintaining law and order, though individuals in civil societies are expected to contribute to doing the same (Chaturbedi, 2006). Within the gamut of maintaining law and order, police are also expected to prevent, detect, and investigate crimes. Policing is undergoing a huge transformation the world over. This is largely true for communities worldwide (Stanislas, 2014). Some countries are more proactive, while others are reactive. Criminals are using technological innovations to carry out crimes. With the advent of the digital India initiative, the country is moving towards implementing e-governance. Consequent to this, information technology-related artifacts and their use are penetrating policing.

The police-civilian ratio in India is far from ideal. For every 10000 civilians, there is one police officer. Over 90 percent of police personnel fall in the ranks of constables and inspectors (Neyroud & Wain, 2014). It is imperative that innovative police reforms must be implemented with the intervention of technology because technology will, to some degree, be able to overcome the lack of manpower.

With the advent of technology, there is an increase in cybercrimes. There are two types of cybercrimes- hacking, disruption of services, etc, and others, including cyber thefts, identity theft, financial frauds, etc. (Prasad, 2004). Criminals have always taken the initiative to employ technology from a historical perspective, more so with the use of information technology in recent times (Worrall & Schmalleger, 2013). Early investigations point out that information and

communication technology can enable police departments to enhance their efficiency capabilities (Bunyard, 1978).

According to Lawrence (2018), police personnel use technology artifacts on a routine basis now. These artifacts include robot mounted cameras. Portable lasers, license plate reading device, etc. On a similar note, Gupta & Jain (2014) inferred that the police force needs to adapt to changing times and requirements of modern policing. The authors specifically pointed out technology interventions in new policing arenas such as cyber security and cyber terrorism. They advocated upgradation of physical infrastructure.

The impact of undetected crimes and unsolved crimes results in loss of work hours, negative influence on economic output, and loss of life and property at one level, and on another level, it affects consumer and citizen sentiments (Dutta & Husain, 2009). This can consequently lead to stalled progress in development (Thapa, 2022). In today's globalized world, where commercial mobility is high, multinational economic engagements lose trust in the business environment (Hao & Sanfelice, 2022). This may have a ripple effect, and the whole phenomenon may turn into a vicious cycle. Loss of tryst leads to low development and employment opportunities, increasing crimes (Rungsrisawat, et al., 2019). The economically weaker sections become more vulnerable entities in this vicious cycle. According to Parmar (2017), innovative policing plays an important role in stopping crimes and creating an amiable environment for social and commercial ecology.

There are, of course, challenges in interventions of technology in policing. According to Budhiraja (2003), if there is a lackluster response from police personnel in engaging with the citizens, the intervention would be a wasteful exercise. Lack of finance, inadequate infrastructure, untrained manpower and lack of clarity on legal frameworks are some of the other challenges in

37

use of ICT in policing (Jayaradha & Shanthakumar, 2003). Cybercrime police personnel many times face uncertain situations because they are not aware of how to address the problem (Mehta, 2009). Some researchers have pointed out the urgency of incorporating non-government and corporate policing in addition to state-sponsored policing (Halder & Jaishankar, 2016).

## 2.2. Technology Adoption and Policing

The leadership of an organization drives any kind of policy change. Technology intervention policies are no different. However, it is also important to note that the affected employees and/or stakeholders have an equal say. If the users of the technology intervention or policy change exhibit high levels of resistance to change, it will negatively hamper the organization's effectiveness and growth (Gautam, 1993). Similarly, no leadership can execute the best plans if employee (user) involvement is minimal (Gautam, 1993). Not only the user engagement with technology but the user's behavior while engaging with technology interventions become important. This behavior may vary according to the innovation or the technology artifact used in the intervention. This is because the determinants of innovation differ in technology features, demography of the users, and protocols of the implementation processes (Wolfe, 1994). The users' (police personnel) entanglement with technology requires a transformation of the users' attitudes (Pradeep, 2013).

Technical innovative practices require dealing with technology hardware, software, or processes and updating existing skills and learning new skills, which further requires a favorable attitude to these changes (Moore, 1992). Over the last two decades, research on gendered differentiation of acceptance of technology has been prominent (Rodgers & Harris, 2003; Beldad et al., 2016; Lian & Yen, 2014; Pengnate & Sarathy, 2017; Slyke et al., 2010; Lin & Hsieh, 2016;).

However, there is adequate research evidence that reflects that technology adoption leads to enhanced productivity in policing. Brown & Brudney (2003) agree that information technology interventions have helped with policing problem-solving and enhanced police personnel's capabilities. Technology artifacts such as mobile phones have helped police in the United Kingdom to keep criminal databases updated on the go (Savvas, 2009). This was possible only because the police personnel could connect, retrieve, and update data from remote locations.

Another important observation from the existing research is a real generic digital divide between rural and urban geographies and demographics (Goswami et al., 2013). With persistent use of a particular technology artifact, the negative experiences may turn into positive experiences, paving the way for sustained adoption of the technology artifact. Muchran & Ahmar (2019) opined that experience significantly moderates the influence of determiners on the behavioral intention. Taylor & Todd (1995) also suggested a significant difference between user groups with more experience and less experience to the extent that the more experienced group had a stronger and positive relation with the behavioral intention.

## 2.3 Technology Adoption Theories

The technology acceptance models represent the dynamics of the relationship between technology usage and human behavior. Rapid growth has been witnessed in the usage of technology, including computer-mediated communication platforms. However, all ICT and Internet-based technologies do not get adopted by users with the same intensity. Of the many repercussions that this phenomenon has had on users is to spoil them for choices with what ICT they want to adopt/accept. For a technology to be used by a large user base for a continued time, it is important for the technology to get accepted/adopted by the users. Apart from technology innovation itself, there can be several other factors that can affect the process of adoption and eventual acceptance. The attributes of technology (product or service) play an important role – how easy is the accessibility, affordability, usability, job-fit of the innovation, and appropriateness

are some of the attributes to be considered.  On the other hand, social factors such as socioeconomic status, user anxiety, subjective norms, etc. are also equally important.

Theories and models for studying and understanding user adoption behavior have evolved over the last few decades. While many of these theories had their roots in the ICT era, they are invariably used to study user adoption behavior in various contexts and sectors  in contemporary research.  Some of the major theories include the following:

- Theory of Diffusion of Innovation, by Rogers (1995)

- Theory of Reasoned Action, by Fishbein and Ajzen (1975)

- Theory of Planned Behavior, by Ajzen, (1985, 1991)

- Decomposed Theory of Planned Behavior, by Taylor and Todd (1995)

- Technology Acceptance Model, by Davis, Bogozzi and Warshaw (1989)

- Technology Acceptance Model 2, by Venkatesh and Davis (2000)

- Technology Acceptance Model 3, by Venkatesh and Bala (2008)

- Unified Theory of Use and Acceptance of Technology by Venkatesh et.al. (2003)

In order to help future academics conceptualize, differentiate, and comprehend the underlying ideas and concepts of technology that may influence the present and the potential usage of technology, these theoretical evaluations will shed some light on prospective applications for technology.

The " spread of new ideas " should act as the basis for any research endeavor investigating the interventions and use of inventions, according to Rogers (1995). Rogers's hypothesis explained that innovations and ideas diffuses in user communities as a function of several factors playing their role. This factor may be exclusive to the idea or to the user, or it can be an extrinsic factor.

Fundamentally, diffusion of innovative ideas occurs when individuals in a group, community, or organization gradually disseminate the idea through conventional and institutional channels. Persuasion, decision-making, comprehension, execution, and confirmation are some of the phases that innovation and adoption go through, which allowed Rogers (1995) to develop his bell-shaped curve to represent user categories of adopters, as shown in Figure 4.
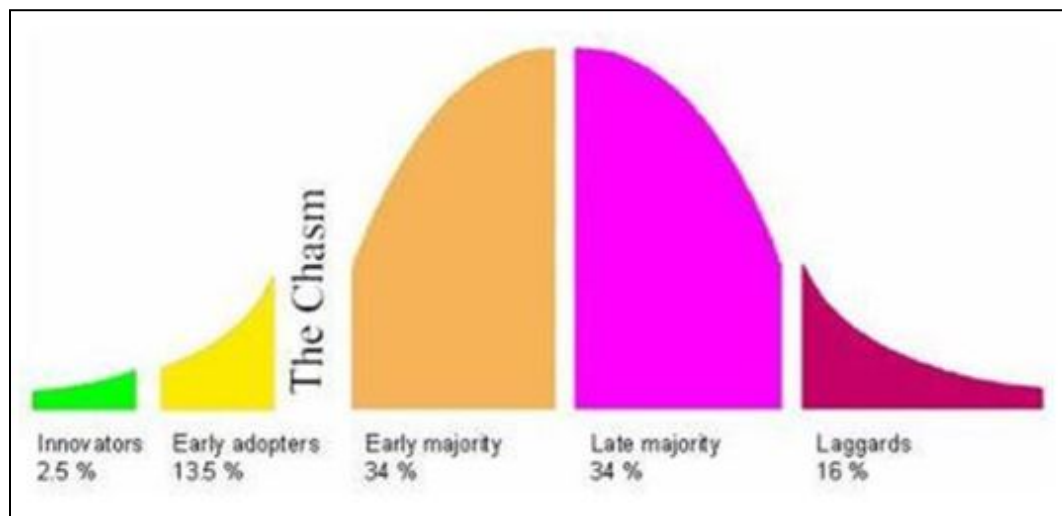


*Figure 4 Roger's (1995) Innovation Adoption Curve*

Goodhue et al. (1995), placed a strong emphasis on individual effect due to the phenomenon of appropriateness of technology for a given task. The term "individual impact" describes increased effectiveness, efficiency, and/or quality. According to Goodhue et al. (1995), when technology aligns with job, there is a greater chance that the technology will be used and that performance will be affected since it better satisfies the requirements and desires of the users. This paradigm, as seen in Figure 5, is suitable for investigating real-world technology use, especially for testing new technology and obtaining user feedback. For assessing technical applications that have already been made available to the public, like the apps available on the iTunes and Google Play Store, the task-technology fit is a helpful criterion.
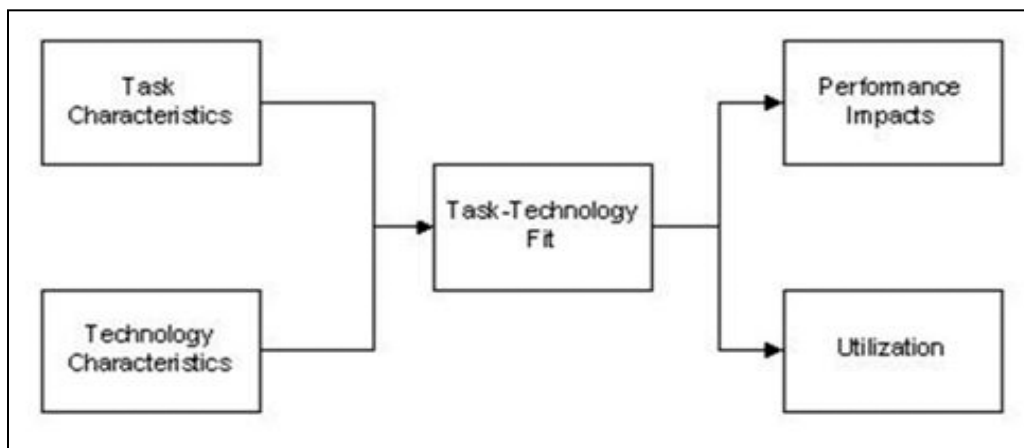
*Figure 5 Task-technology fit (Goodhue and Thompson, 1995)*

Theory of Reasoned Action (TRA) was first proposed by Fishbein and Azjen (1975), depicted in Figure 6, to be used in sociology and psychology. Later on, it was also widely used in several other disciplines like management and services, IT and ITES. The focus of this theory is on behaviors on which individuals have the most control to execute. Human behavior is explained through attitudes, social norms, and intentions. Attitude is understood as unfavourableness or favorableness of a person's feelings for a behavior. According to this theory, social norms refer to the social influence experiences in social structure and intentions refer to a person's decision to act or not to act in a certain way. Behavior intention is significant for carrying out behaviors over which an individual has a high degree of control and flexibility to execute. Individual Attitude and Normative Influence are two determinants of behavioral intention. The influence of an individual's way of doing things intentionally is referred as the attitude towards carrying out the behavior. The impact of pervasive normative structure on an individual is referred to as one's subjective norms.
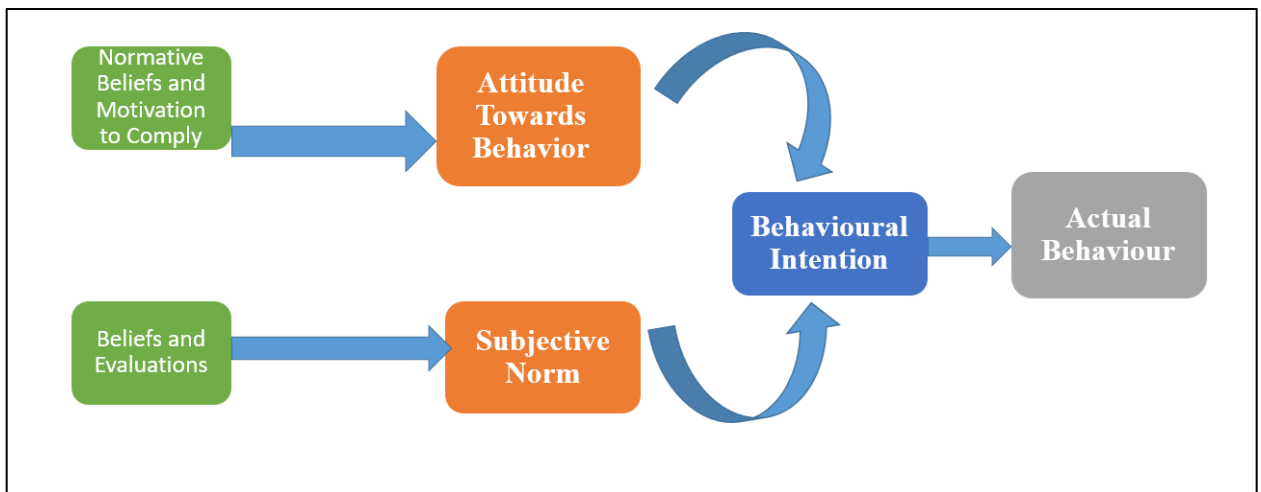
The Theory of Planned Behavior, proposed by Ajzen (1991), as shown in Figure 6, focuses on a single element that influences an individual's attitudes towards a certain activity and their behavioural intention, as seen in Figure 7. The main constructs of the theory are explained as follows:

*Normative beliefs -Subjective norms*

- **Normative belief:** This can be defined as the user's perception of social normative influence (for example in the case of the educational context, pressure from teachers, and educational administrators).

- **Subjective norm:** This can be defined as the user's perception of a certain behavior (like participating in an online discussion forum), which is influenced by other important people (e.g., spouse, parents, friends).

*Control beliefs - Perceived behavioral control*

- **Control beliefs**: This can be defined as the set of user's beliefs about the presence of relevant facilitating or hindering factors that may affect the behavior.

- **Perceived behavioral control**: This can be defined as the user's perceived ease or difficulty (for example, with respect to the technology user interface) of carrying out certain behavior (for example, booking an online ticket).

43

*Behavioral intention - Behavior*

- **Behavioral intention**: This can be defined as a reflection of the person's willingness to carry out a given behavior.

- **Behavior**: This can be understood as the user's tangible response in a given situation.

According to Ajzen (1985), certain behaviors can be executed if the behavioral intentions and behavior control are synchronized so that the latter moderates the effect of intentions on actual behavior with the result that a positive intention leads to the desired behavior when behavior control is intense and strong.
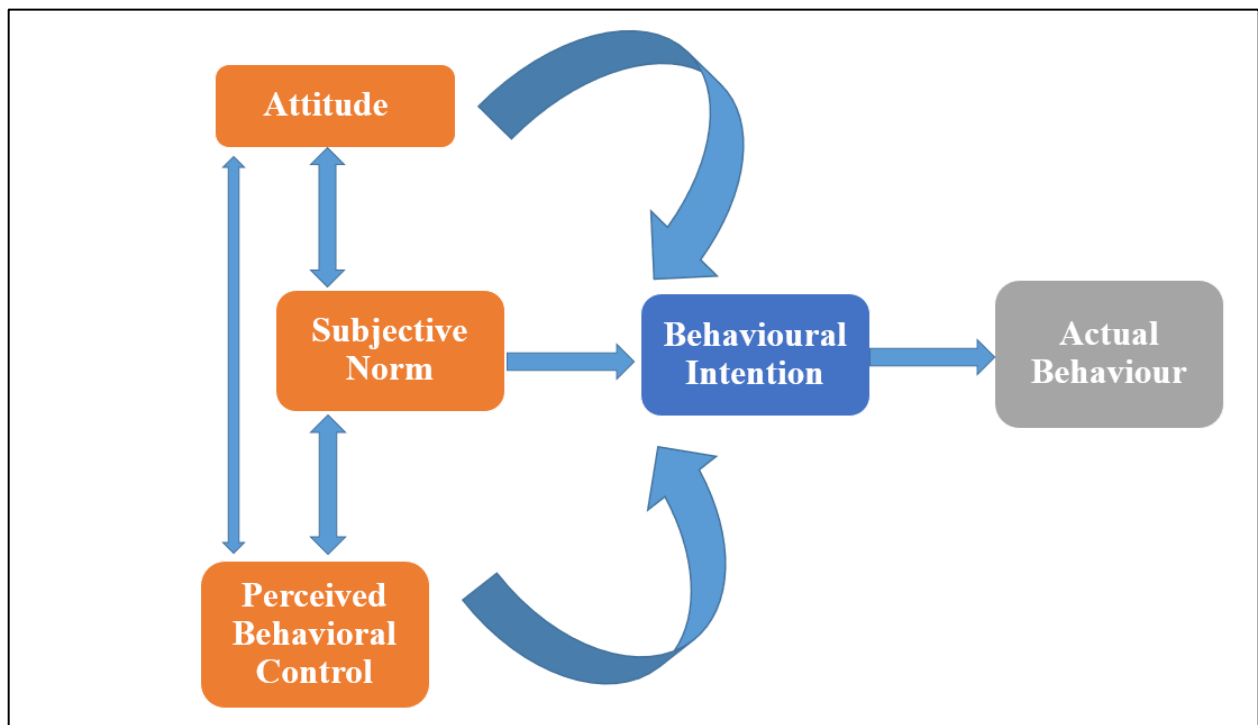


*Figure 7 Theory of Planned Behavior (Ajzen, 1991)*

The Theory of Planned Behavior has 3 determinants influencing behavioral intention. There were Subjective Norms, Attitude, and Perceived Behavior Control. These factors of the Theory of Planned Behavior were broken down into sub-factors in the Decomposed Theory of Planned Behavior (Taylor and Todd, 1995), resulting in a total of fourteen constructs.According

to this theory, Perceived Usefulness, Perceived Ease of Use, and Compatibility affect the attitude of a user that leads to the intention and intention finally leads to the actual usage. Social Influence, Peer Influence, and Superior Influence determine the Subjective norm of a user which in turn affects the Behavior Intention that leads to the actual Usage. Self-Efficacy, Facilitating Condition Resources, and Facilitating Condition Technology determine the Perceived Behavioral Control leading to favorable Intention which in turn leads to the actual usage.
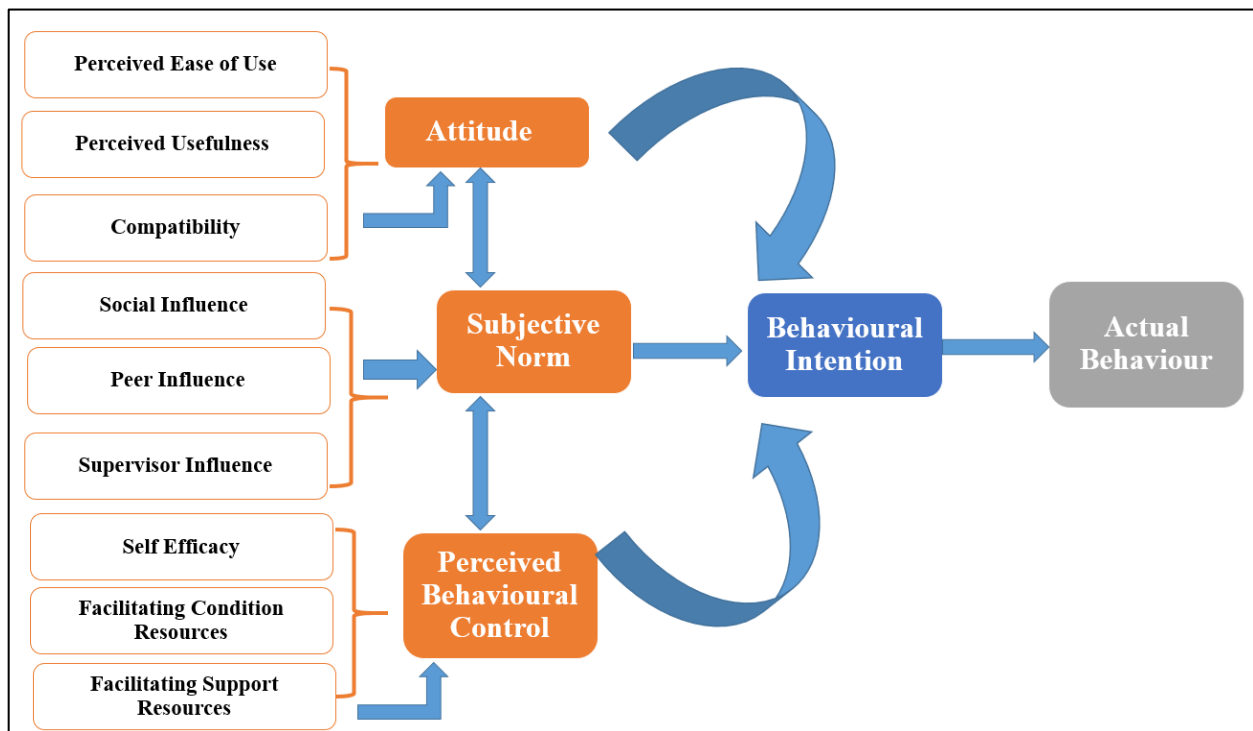


*Figure 8 Decomposed Theory of Planned Behavior (Taylor and Todd, 1995)*

Fred Davis (1989) proposed the Technology Acceptance Model (TAM ). Initially, Davis proposed that an individual is directly influenced by the features and capabilities of any system and then it leads to internal motivation and the user shows the actual usage behavior. TAM was redefined and new variables were added into the model. The variables "Perceived Ease of Use and Perceived Usefulness" decide the attitude of the person which further affects the Behavioral Intention and eventually, it leads to the Usage of the system.

Perceived Usefulness has been defined as a reflection of an individual's belief in the system to be useful for what they want to do. Perceived Ease-of-Use has been defined as the extent to which a user believes that the use of technology (system) would require minimal effort or no effort. If a given system is difficult and complex to operate, if the user interface is complicated etc., then the user's attitudes towards it would be negative. Also, external variables such as social influence are also important. In addition, the moderating variables such as age, gender, experience, etc . also play an important part in creating perception.
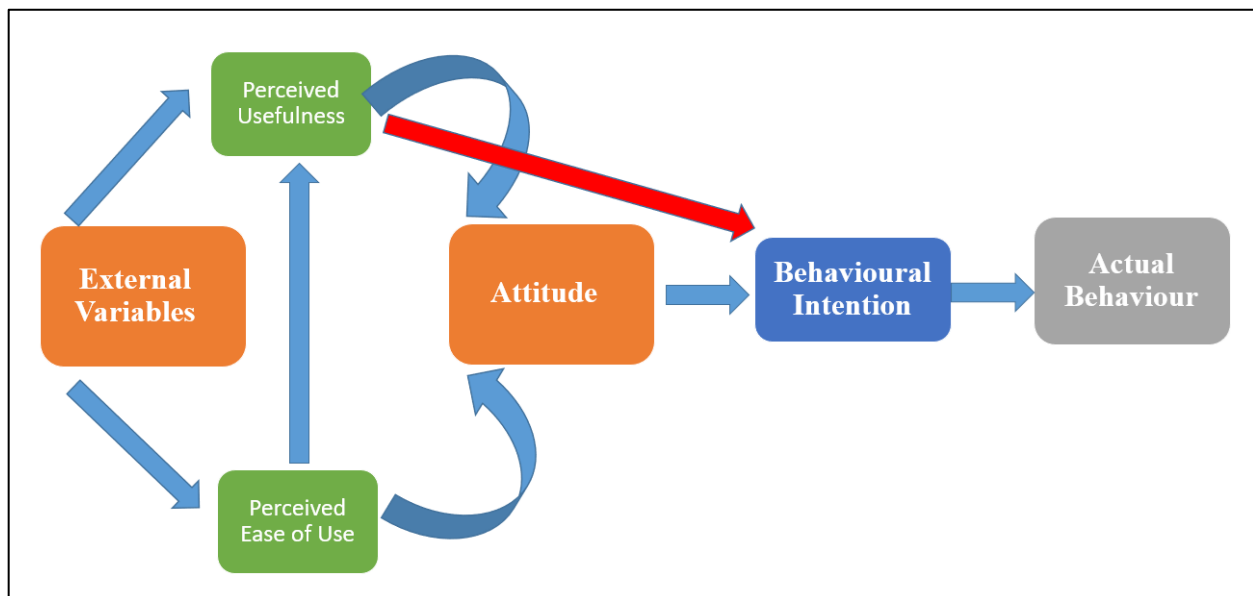


*Figure 9 The original Davis (1986) Technology Acceptance Model*

Technology Acceptance Model (TAM ) was extended by Venkatesh and Davis (2000) in the form of TAM -2 to describe the - "perceived usefulness and usage intentions using social influence and cognitive instrumental processes as determining constructs".  Early research indicated that perceived usefulness determines intention to use. It became imperative to investigate the determiners of perceived usefulness and how these determiners also influence the changes in user behavior as technology usage increases over time. According to the theory's authors, identifying factors leading to a higher degree of - "perceived usefulness enabled organizations to

design organizational interventions that would increase user acceptance and eventually usage of new systems". Subjective norm has been defined as the user's perception of a certain behavior (like participating in an online discussion forum), which influences significant others (e.g., parents, spouse, friends). Voluntariness is understood as the user's belief that the act of adopting/using the technology was non-mandatory. Image has been defined as the extent to which technology usage has led to a perceived improvement in one's status in a social system. Job relevance has been defined as the perceived degree to which the user believes the technology/system is appropriate for a person's work. Output quality has been defined as the perceived ability of the system/technology to perform specific tasks. Result demonstrability refers to the notion that the tangible output as a result of technology/system use will directly influence the system's usefulness. The model is presented in Figure 10.
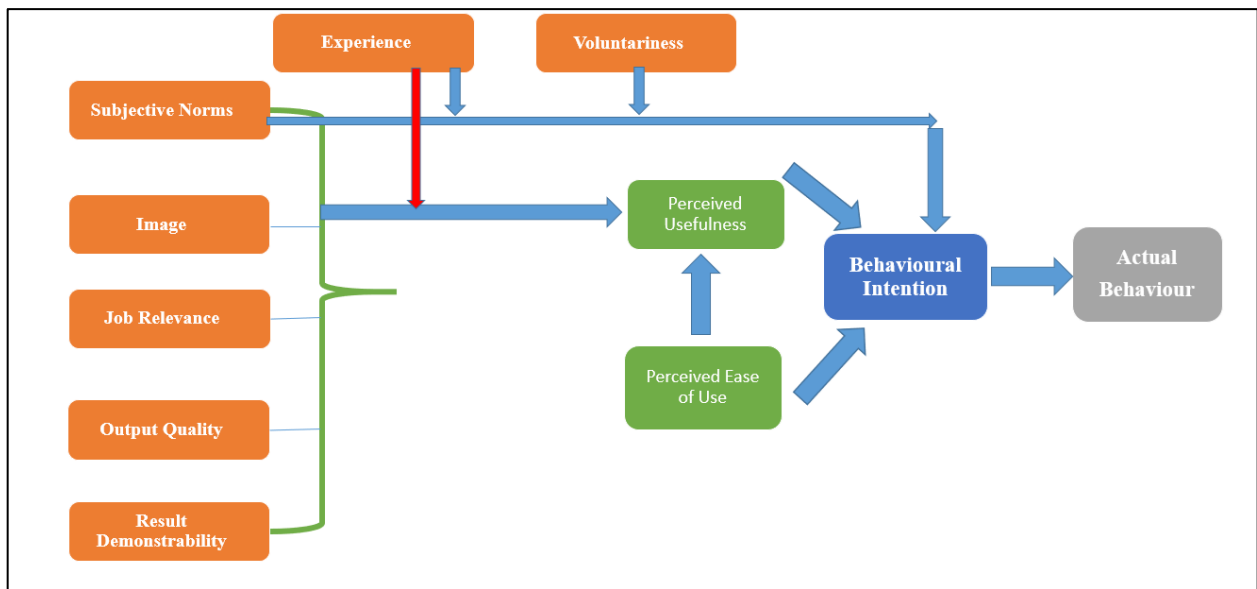


*Figure 10 Technology Acceptance Model - 2*

The extended version of the Technology Acceptance Model, TAM 2, did not account for the attitude towards the intention of use. Moreover, the determinants of perceived usefulness were addressed and included in TAM 2, but the same was not addressed for the perceived ease of use

construct. Therefore, Venkatesh and Davis (2000) proposed TAM 3, which is represented by this addition. These additions are included in two sets, the Anchors and the Adjustments. The general belief notions surrounding computers as technological interventions in work and their usage in specific were called the Anchors in TAM -3. The Adjustment refers to the beliefs that are a result of the experiences with the technology engagement. The model is presented in Figure 11.
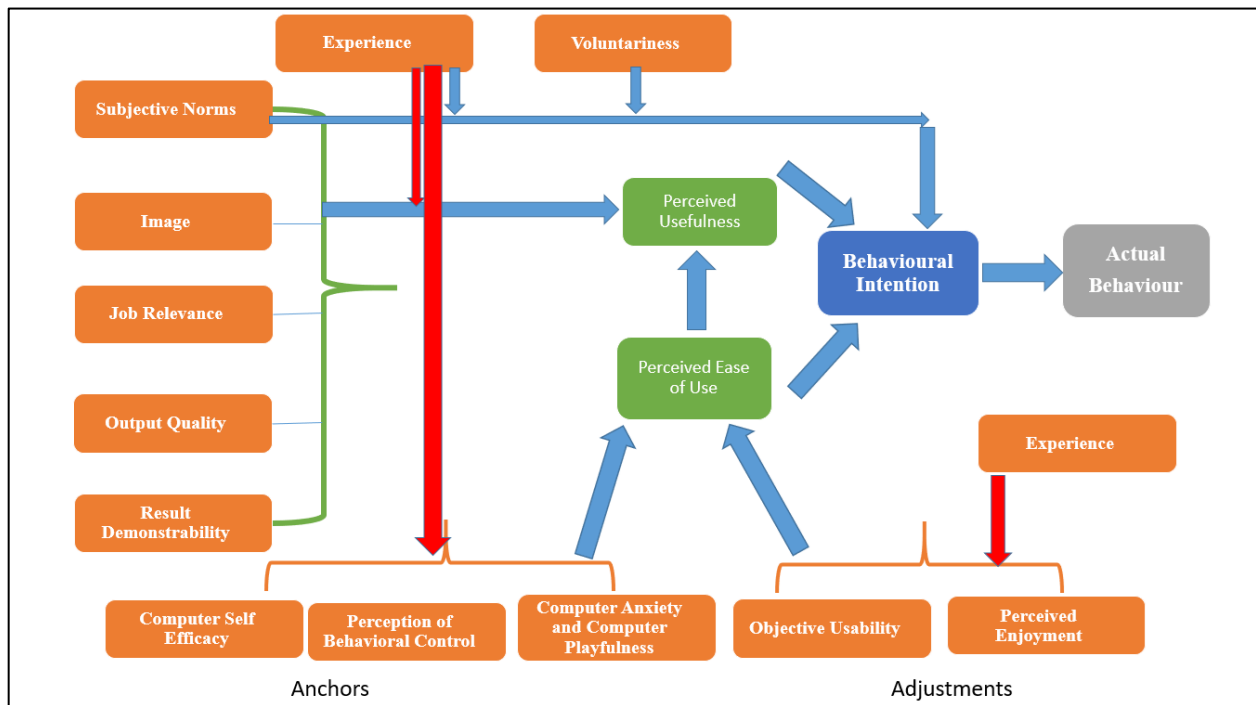


*Figure 11 Technology Acceptance Model -3*

The Unified Theory of Acceptance and Use of Technology (UTAUT), proposed by Venkatesh et.al (2003), is an amalgamation of eight previous theoretical models namely : Technology Acceptance Model, Theory of Planned Behavior, Theory of Reasoned Action, Model of PC utilization, Motivational Model, Innovation Diffusion Theory, combined TAM and TPB, and Social Cognitive Theory. 32 constructs were identified from the existing theories of technology acceptance after a critical review. The identification of these constructs was based on their significance in influencing the behavioral intention of the user of technology. Other than the thirty-two constructs, four moderating variables namely – experience, voluntariness, gender, and

age were also included in the theory. Constructs and moderators taken from the existing theories and models were tested in different settings with different participants. By observing the results, seven constructs were selected as direct and significant determinants that affect the intention of a user to use a particular technology. The authors of the theory opined that - "Effort Expectancy, Performance Expectancy, Facilitating Conditions, and Social Influence are considered as the direct determinants which lead to the intention to use technology. Self- Efficacy and Anxiety are considered as indirect determinants. Apart from these determinants, four moderators are also included name, age, experience, gender, and voluntariness of use". The model is presented in Figure 12.
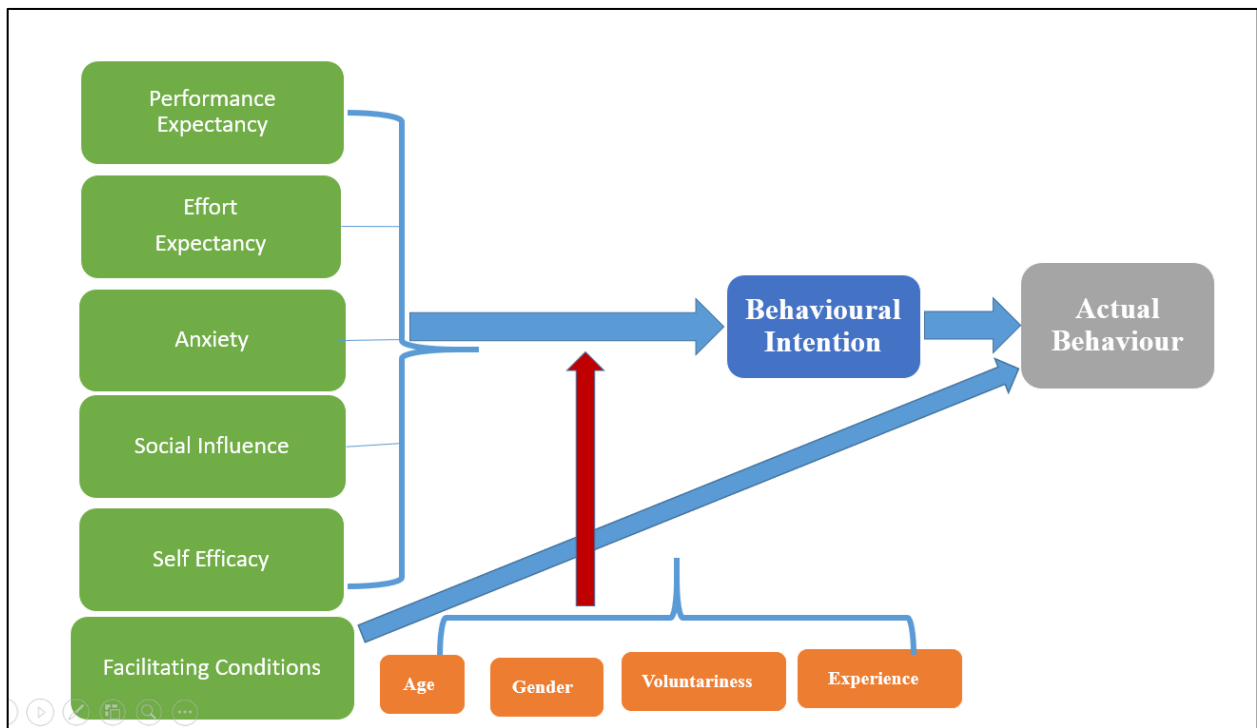


*Figure 12 Unified Theory of Acceptance and Use of Technology*

Various theories of assessing the technology adoption behavior of users have been used to study the phenomenon in numerous contexts. Davis et.al. (1989) utilized TAM and TRA to modify the existing models. While their model found that subjective norms was not a significant

determiner of attitude, other models found the subjective norms significant. Mathieson (1991) and Yi et al. (2006) utilized the theory of planned behavior to postulate that subjective norms can influence the pace of technology adoption, while Chau and Hu (2002) observed the contrary results. Other studies (Venkatesh and Davis (2000); Shih & Fang, 2004) observed that in mandatory context, behavioral intention is a more significant determiner than in voluntary settings.

Davis, Bagozzi, and Warshaw (1989) opine that in a personal context, subjective norms do not have a significant influence on behavioral intention. Some studies have also reflected that TAM showed better results in measuring technology adoption behavior than other theoretical models, such as the Theory of reasoned action (Chau & Hu, 2002; Han, 2003; Lai Zainal, 2014, 2015).

Additional determiners were added to the original TAM model to increase the model's robustness and improve the model efficiency to explain the variance in the results (Venkatesh & Davis, 2000; Venkatesh & Bala, 2008).

Colvin and Goh (2005) explored the attributes of employing technology by petrol officers. Through CFA, construct factorial validity was obtained. Four vital factors were obtained ease of use, usefulness, quality of information, & timeliness. The findings recommended that the novel factors of quality of information and timeliness were the most vital elements of technology acceptance by patrol officers. Voluntariness has invariably been postulated as a moderator of the relationship between determinants and behavioral intention (Chen et al., 2015; Abbasi et al.,2011). The voluntary use of ICT can potentially integrate the technology at the workplace in policing. Additionally, research also indicates that the mandated use of technology incurs higher integration costs (Tsai et al., 2017).

Conventionally, it is understood that female technology users are slow learners and late adopters of technology. Most internet users were men at the turn of the century (Weiser, 2000). According to ITU (2017) men outnumbered women by 12 percentage points in using information and communication technology. Over the last two decades, research on gendered differentiation of technology acceptance has been prominent (Beldad et al., 2016; Lian & Yen, 2014). Consequently, it follows that gender plays an important role in technology acceptance.

Shahini et al (2022) surveyed 73 Law enforcement officers and found the attributes of intentions towards the use of the ADAS technologies. Findings revealed that belief and skill inculcation in ADAS features can meaningfully raise law enforcement officers' purpose to use the technologies. The results delivered strategies to improve LEOs' acceptance towards ADAS. Vehicle smashes are the key reason for grievances for law enforcement officers discharging duty. These smashes happen because of the speed and technology used when they drive. Findings confirm that advanced driver assistance systems have the probability to diminish smashes and accidents which positively affects LEO safety in police operations.

Chan (2001) did a study to find out whether information technology had any influence on policing and found that the possible returns of computer applications to police work were recognized, and it requires further research investigations on the effect of IT on policing. A high correlation and projected improvements were obtained in police effectiveness and performance. Nunn (2001) studied the proficiency of computerization and obtained through the study that vastly computerized places testified bigger parts of personnel in technical places, reported more expenses and few act variances between civic controlling officers and didn't practice cellular digital packet Performance was defined as databased data, exploratory inquiries, officer efficiency reports, and routine assessments.

Smith, Caputi, and Rawstone (2000) studied technology impact and obtained it was reliant on the range to which personnel acknowledged the technology. They also obtained the reasons for the acceptance and rejection of computers by employees and mentioned that it is very important in information systems research. Employee acceptance was assessed that simplified computerized communication, entree to crime information catalogues, and report inscription. They also proposed a model to know police personnel's reasons for avoiding the technology.

Apostolopoulos et al. (2020) define a rural area as the countryside outside the periphery of urban settlements. These largely also include villages and small settlements. These areas are characterized by limited accessibility and availability of technology artifacts in many ways as compared to cities. Another important observation from the existing research is a real generic digital divide between rural and urban geographies and demographies (Goswami et al., 2013). The group differences with respect to geographical settings and the determiners of adoption of ICT are mixed.

With persistent use of a particular technology artifact, the negative experiences may turn into positive experiences, paving the way for sustained adoption of the technology artifact. Muchran & Ahmar (2019) opined that experience is an important moderator of the relationship between determiners of behavioral intention to use technology. Taylor and Todd (1995) also suggested a significant difference between user groups with more experience and less experience to the extent that the more experienced group had a stronger and positive relation with the behavioral intention. In this study, the more experienced police personnel were more comfortable using the ICT and IFTK in their jobs. According to Azam et al. (2010), users' experience with technology is a strong moderator of the intention to use technology.

Technology adoption research with education level as a moderating variable has highlighted mixed findings. Legris et al. (2003) conducted an exhaustive literature review of various moderating variables used in technology adoption studies. They found that users having a higher level of education were less likely to adopt the MIS systems. Al-Gahtani (2003) studied the effect of education on some of the determiners and found that the education level of a user is a significant moderator. Similarly, Abu-sharab (2011) found that education level significantly affected the relationship between performance, social influence, self-efficacy, and behavioral intention.

Tam et.al (2019) mentioned that with the growing request for the safety of the country and the mounting character of police forces, police activities advanced profoundly in IT use to provision prolonged directives. The association between investment in IT and police evaluations had been quite uncertain it was found and adapted to the professional ethos of regulations. It gives directions towards effective law execution systems as cited in many research interventions. The study conducted by Bouwman et. al. (2009) inspects the character and associative values of task and IT features with individual characteristics of the adoption of mobile technologies. Officers were also inquired about the kind of mobile applications they used in contexts and for specific tasks. It was obtained through these interventions that TAM models are too general to examine the empirical effects of such interventions and further studies must come up with the models that could be tested by studying mobile-based applications.

Shih and Fang (2004) utilized the TPB and Decomposed TPB to examine the adoption of online banking. The observation of the study was that the intrinsic determiners were more significant than the extrinsic determiners. How rapidly payment systems evolve is determined,

according to Hoenig (1995), by the interfacing of technological advancement and inherent obstacles to the consumption of new goods and services. Several theories explain why consumers desire to use and accept new technologies (Lai, 2016).

The age of the technology users, in this case, police personnel, and their experience with using technology are related. Although, this is not a linear relationship. Although the age of the users is considered an important moderating variable (Porter & Donthu, 2006; King & He, 2006), however, it has not received as much attention as other demographic variables (Wang et al., 2009). Tarhini et al. (2014) in their study observed that age is a significant moderator of the effect of ease of use, usefulness, and self-efficacy on behavioral intention. Research also suggests that age difference also affects the perceived difficulty level of the technology itself (Morris et al., 2005).

Existing research also delves into investigating the role of availability in technology adoption. The broad observation is that rural areas lag behind urban areas regarding technology availability. (Grubesic & Murray, 2004; Kunin & Blosser, 2003). While this observation is more general, it embodies an important conceptual construct of the current study. Technology availability has been a very important factor for businesses to explore e-commerce (Wymer and Regan, 2005). Support resources and auxiliary services have also been identified as very important aspects of the overall availability of technology as they influence the usefulness and effort requirements of using technology (Martins & Kellermans, 2004; Mao et al., 2005). Klopping and McKinney (2004) explored the impact of availability on the possibility of performing the expected and desired behavior.

Davis (1989) postulated that a user finds it helpful to observe the functioning of a technology artefact and then attempts to use it. Consequently, the user has to have the technology artefact available to him/her for practising to use it before a long-term commitment to using and eventually accepting the technology. This also propounds that the availability also affects how frequently the user can use it. The higher the frequency, the more likely it will be that the user will engage with it.

Abner et. al. (2024) explored the assistance of endorsement from the Commission on Accreditation for Law Enforcement Agencies (CALEA), through qualitative methods using an inductive methodology. It was obtained that CALEA augments administrative knowledge with the progress of advisors, the formation of groups of preparation and training, facility for data centers, executives and larger heights of accountability with transparency. The study endorses qualitative components and methods to comprehend the research on accreditation through organizational learning resulting from accreditation.

Basten et al. (2018) highlighted that the Commission on Accreditation for Law Enforcement Agencies police accreditation has a practical effect on organization-based knowledge. Knowledge brokers play a vital part in connecting, disconnecting and now and then contrasting thoughts and methods obtained by Pawlowski and Robey (2004). The allocation of knowledge is evinced by the progression and formation of new values and strategies that follow authorization ideals which are significant to limited situations.

Training with technology is an important influencer of technology adoption because it promotes a positive perception of effort expectancy and usefulness (Srite & Karahanna, 2006). McElroy et al. (2007) pointed out that technology-oriented training led to a favorable assessment

of self-efficacy and reduced anxiety about using technology. Gong et al. (2004) also agreed that self-efficacy changes due to extrinsic factors that include training and communication. Stylianou and Jackson (2007) opine that lack of training is a knowledge barrier and significantly affects perceptions about usefulness.

Perceived usefulness is understood to have a positive and significant effect on technology adoption (Davis et al., 1989). The authors define it as the degree to which the user believes engaging with the technology will improve his/her performance. Similarly, Lederer et al. (2000) also opine that there is a meaningful and strong relationship between usefulness and the actual use of technology. Barhoumi (2016), in his research, underscores the relationship between effort expectancy and usefulness, leading to increased awareness about technology adoption.

Sweeting et al (2023) worked on police training and recruitment processes. They obtained that staffing events have not significantly altered in the last few years. It assisted in confirming whether the process was fine. They used police personnels across diverse places and findings were that those police trainers had been quite alert on the values and abilities of recruits. Trainers' assessments on reorganizations to police enrolment, the inferences were assessed. Formal psychometric testing was given prominence to avert unfitting entrants to joining and in comprehending the personalities towards force.

Suharini (2023) notices the community acceptance of the InaRISK BNPB platform, a new method to disaster management that blends digital technology, Geographic Information Systems (GIS), and the Internet of Things (IoT). They used The Technology Acceptance Model as a lens to interpret the acceptance designs. These findings underscore the vitality of usability and

perception in promotion of technology acceptance. Features of InaRISK were evinced as informative also comprehensibility strengthening its acceptance within the community.

There is a growing demand for police leaders to progress groundbreaking methods to augment and ensure the mental health and well-being of police. Policing in America is facing too many concerns touching upon distinct crimes, low levels of confidence, employment and absorbent issues as important cause of suicides in policing (Thompson, 2022). The study highlights how a factor of resilience, reflecting on and undergoing awe, can back police leaders in discovering imaginative and evocative conducts to discourse present policing issues.

Bowman et al (2008) mention the context borders and individual features for partialities of mobile applications of police. The study used acceptance, media choice and task-technology fit theories, the sample was police officers, and they were queried regarding detailed communication devices they chose in explicit circumstances. The results solely on distinct features of single entity and context features gave prominence preference on communication technologies, as per conjoint analysis. On inclusion of both into a single model, the outcomes display that the implication of the TAM variables was found to be low and the context-related issues become more significant. The research highlighted that police organizations are informative intensive and have full potential to access information towards better efficiency of police work and so, emphasizes considering contextual factors for future research.

Winroth et al (2023) stressed that technology is always 'technology-in-practice'. For this, context and perspective are dynamic as technology is not essentially used as planned, and its use cannot be assessed as neutral; it always possesses varied interdisciplinary knowledge of prosecutorial, institutional, societal, etc. interventions. An important element of comprehending

and managing policing is the examination of how technologies are thought of, accepted and managed towards understanding policing performances and requirements.

Strom (2017) emphasizes technological interventions law enforcement could affect the police in current society as technology such as LPRs has produced many conversations about concealment and BWCs have been signaled as a technique of cultivating police associations by endorsing more public communications. The study comprehends the basic determinants which foster acquisition, progressions of execution, and the perceived influence of technology on policing happenings. The findings reveal that preferred technology includes crime mapping, social media, data mining, car cameras, LPRs, and BWCs. Research contends further research is required to comprehend the accuracy of this explanation and the degree of technological developments.

Weisburd and Neyroud (2011) found a positive relationship between computerized crime mapping and "cosmopolitanness" of police organizations. Early users of this technology have a positive relationship with surrounding crime mapping. Skogan and Hartnett (2005) found a comparable connotation in their research of the use of a centralized data warehouse and evinced that agencies who were tangled in "cosmopolitan networks".

Mamalian et al. (1999) found that computerized crime mapping software through GIS is executed by police organizations to plan, envision, and examine the grievances, spot crimes, and trails to exhibit their occurrences. GIS could produce graphic presentations of crime happenings for officers and also recognize other designs of local crime motion that may eventually aid inform the positioning of officers in the field and for comprehending contextual characteristics which implicitly affect the whole process (Rich, 1995).

Technological developments have altered policing so meaningfully that distinct approaches and instruments are outdated compared with present technology (Goodison et al., 2015). As discussed by Koper et al. (2015), research suggests that IT interventions amplified police competence, yet it needs to be thus addressed through multiple interventions as to the extent these have empowered law enforcement towards efficiency as argued by Roth, Koper, White, & Langston (2000) and Lum (2010).

## 2.4 Research Gap

The review of research literature in this chapter highlights that there are two threads of research focus in the area of Technology Acceptance Behavior, namely: first, research related to the development of theoretical models of technology acceptance behavior, and second, research related to the application of these models focusing on studying acceptance behavior of users of technology.

The second area of focus, which is applied research in technology acceptance, treats organizational context as an important part of the phenomenon of technology-enabled ecology, though there have been studies focusing on individual users also.

The following research gaps have been identified as a basis for this study:

- The literature review of the research in the domain of technology and policing revealed that there have been numerous studies on technology usage in policing. These studies have focused on the evolution of technologies for policing and technology penetration in policing to some extent. However, the research body does not reflect much on the very important component namely the technology acceptance behavior of police personnel.
- Some studies have investigated behavioral aspects for law enforcement entities, but at the organizational level. Eventually, it is the police personnel who will be using the

technologies. Therefore, studying the technology acceptance behavior of people engaging with the technology artefacts becomes important.

- Most of the studies focus on specific technology artefacts such as the internet, computers, or mobiles. No study could be traced which explored a more encompassing gamut of technology artefacts which police personnel encounter on daily basis. This study chose to investigate ICT and IFTK adoption behavior at the same time. This would allow for comparative insights also.

- There is a dearth of technology acceptance behavior studies in Indian context. Literature review suggests that there have been studies on uses of technology, but not on the user behavior aspects. Therefore, this study would add to the existing research body in Indian context in this domain.

## 2.5. Summary

This chapter presented the literature review of the existing research in the sphere of technology adoption behavior of users, particularly in policing and law enforcement. The chapter starts with reviewing technology and policing in general and then explains with critical insight the specific arena of technology adoption in the policing domain. The next section presents the domain's theoretical background and the models' nuances. The sections cover the major theories and their constructs and lucidly explain how the domain of technology adoption has evolved over the last few decades. Following the theories, the section provides detailed review of the studies employing these theories in various contexts and with modifications to study the phenomenon of adoption behavior. Based on the exhaustive literature review, the chapter presents the research gap identified for the study.

# Chapter 3

# 3.Methodology

This research study focuses on the technology acceptance among the police personal in Rajasthan. To fulfill the objectives of the study, an in-depth exploration of the user behaviour (police personal behaviour) in terms of adopting a technology have been carried out using a mixed method approach. In a mixed method approach, both qualitative and quantitative data are incorporated to obtain a comprehensive picture. As noted by Creswell, Plano Clark, Gutmann, and Hanson (2003), "A mixed-method study involves the collection or analysis of both quantitative and/or qualitative data in a single study in which the data are collected concurrently or sequentially, are given a priority and involve the integration of the data at one or more stages in the process of research."

This chapter explains the methodology used for investigating the research objectives. This includes an explanation of the methodology - research design, sampling technique, and tool construction - establishing reliability and validity.

## 3.1. Research Design

Research Design of a study provides a detailed plan for addressing the objectives and to answer the research questions (Creswell et al., 2003). This study used a sequential explanatory mixed-method approach involving two phases to explore the objectives of the study. The design involves combining the quantitative and qualitative aspects to comprehensively understand the user behaviour – the ICT adoption behaviour and the IFTK adoption behaviour. The findings from the quantitative analysis help in understanding the perception of police personal towards adopting and using the ICT and IFTK. Qualitative data in the form of semi-structured interviews was used

to explain and understand the important factors responsible for adopting and using the ICT and IFTK.

Figure 13 presents the schematic representation of the research design. The design includes the use of quantitative survey method to source the data and the qualitative method to collect the narrative discourse. Two scales have been developed for quantitative survey. The ICTAS has been designed to capture the perceived behaviour of the police personnel with respect to the determinants of the ICT Adoption. The IFTKAS has been designed to capture the perceived behaviour of the police personnel with respect to the determinants of the IFTK Adoption. Structured interviews were conducted to support the quantitative finding with the narrative discourse reflecting the perceptual and the experiential aspects of user behaviour. The data was collected through multi-phase sampling approach which is discussed in sections to follow.
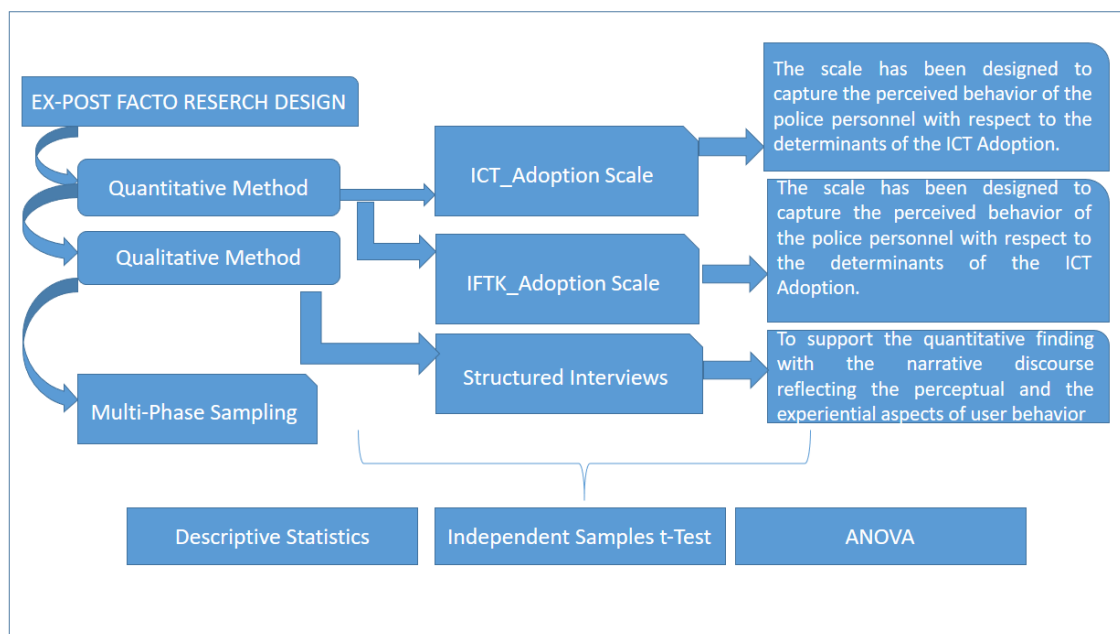


*Figure 13 Research Design of the Study*

## 3.2. Theoretical Framework

The theoretical framework used for this study has been derived from the Unified Theory of Acceptance and Use of Technology (UTAUT). Some of the constructs have been borrowed

from the original model and customized while others were added to suit the context of the study. UTAUT postulates that the behavioral intention of the user to engage with technology is driven by performance, effort, social influence and facilitating conditions. In addition, facilitating condition is a direct determiner of usage behaviour. Further, behavioral intention drives the actual usage of technology. In addition to the determiners, UTAUT theory also proposes that age, voluntariness, experience and gender plays moderating roles. Figure 14 presents the modified UTAUT model used in this study.
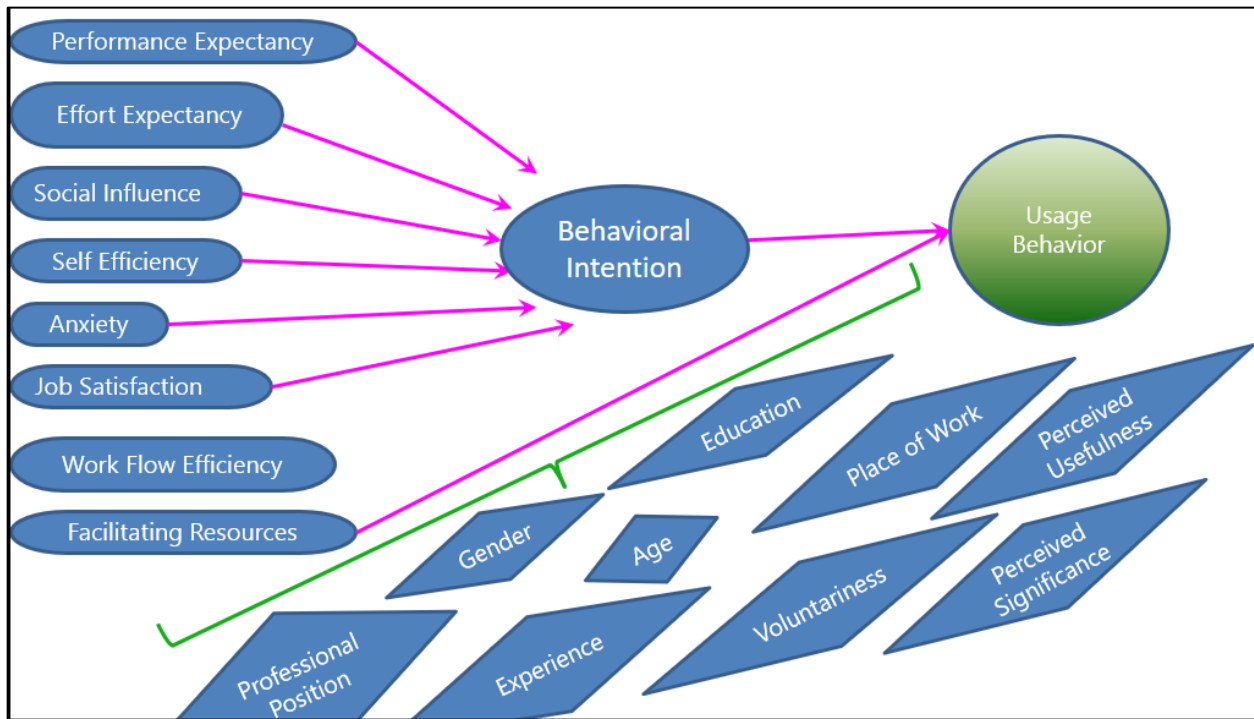


*Figure 14 Theoretical Framework used in the study*

In addition to the existing determiners of the theory, the researcher has added certain other constructs and moderating variables. These are described in Table 1.

*Table 1 Determinants and Moderators used in the theoretical framework*

| Determinant of Technology Adoption | Operational Definition |
|---|---|
| **Performance expectancy** | The degree to which an individual believes that using ICT/IFTK will help him or her to attain improvements in his/her policing tasks. |
| **Effort Expectancy** | The degree of ease associated with the use of ICT/IFTK. |
| **Social Influence** | The degree to which an individual perceives that people important to him/her believe that he or she should use ICT/IFTK. |
| **Facilitating Conditions** | The degree to which an individual believes that an organizational and technical infrastructure exists to support the use of ICT/IFTK. |
| **Self Efficacy** | The degree to which an individual believes that he or she has the ability to perform learning tasks using ICT/IFTK. |
| **Job Satisfaction** | The degree to which an individual believes that he or she is contented with the use of ICT/IFTK in their work. |
| **Workflow Efficiency** | The degree to which an individual believes that he or she is enabling workflow efficiency beyond his/her job by using ICT/IFTK. |
| **Anxiety** | The degree to which the user perceives the absence of fear while using ICT/IFTK. |
| **Behavioural Intention** | The degree to which an individual has formulated conscious plans to perform or not perform some specified future behaviour. |
| **Usage Behaviour** | It is the self-reporting of the actual use that an individual has undertaken. |

## 3.3 Population and Sample

The primary data for the study was collected from police personal across Rajasthan. The main sources of data collection would be through Scales and interviews which will able to cover both the tangible and intangible aspects. The population and sample size would be determined the

spatiality and the Rajasthan Police Organizational structure. Multi-phase sampling approach was used for the final sample selection as depicted in Figure 3.3.

Out of the 8 police ranges, 3 ranges were selected for the study. This selection was based on convenient sampling approach. The 3 ranges were selected namely, Jaipur, Jodhpur and Bikaner. These are the biggest three ranges in terms of number of police personnel in service and in terms of the demography and geography served. After this, in the second phase, one circle from each range was selected. This selection was randomly selected from the list of circles in the given range. After this a list of all the police personnel serving in the selected circle was drawn from the service register to create a sample frame. Systematic random selection was then utilized to draw the final sample from the sample frame. The sampling was done to draw a representative sample keeping mid the following aspects of the serving police personnel: Police Ranges in Rajasthan, Commissionerates' in Rajasthan, Number of Police Circles, Numerical strength of Police Personnel deployed in the Ranges and Commissionerates, and the hierarchy of police personnel covered in the sample size.
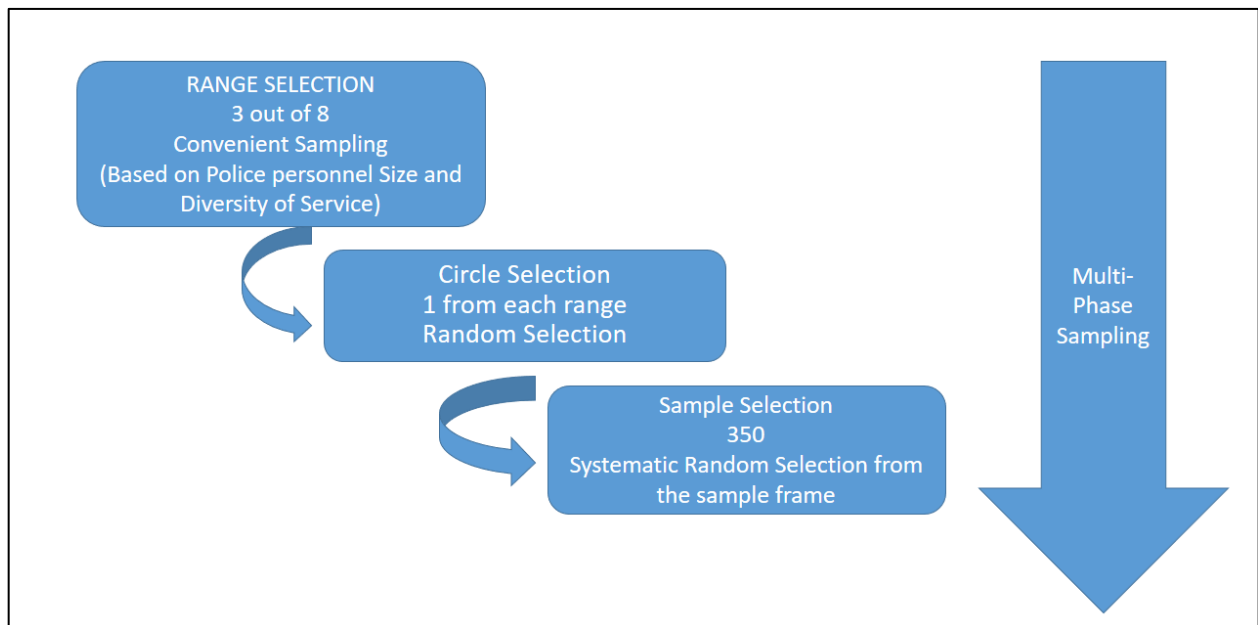


*Figure 15 Sampling approach*

## 3.4. Tools for Data collection

For the purpose of collection of data, two scales were prepared, namely the Information and Communication Technology Adoption Scale (ICTAS) and Investigation Tool Kit Adoption Scale (ITKAS). The psychometric properties of the tools, in terms of reliability and validity, were calculated for generalizability. The description of the standardization process was explained in the subsequent sections. Qualitative data were collected using semi-structured interview schedules, and the findings of the qualitative interviews are presented in the last section of the chapter.

## 3.4.1. Development of Information and Communication Technology Adoption Scale (ICTAS)

The Information and Communication Technology Adoption Scale (ICTAS) was prepared based on the literature review. Items were formulated for each attribute of the Information and Communication Technology Adoption Scale (ICTAS). The scale included thirty-two items that were accessed for language correction, vagueness, repetition, and redundancy. Finally, fifty-one items were retained to establish content validity, to check whether the scale incorporated all pertinent domains. Content validity was verified to determine whether the scale covered all aspects of technology adoption behaviour in policing.

The scale was given to seven experts to check content validity, and experts were provided with a checklist for identifying the item as relevant or non-relevant. After validation, some items marked as not relevant were removed. The scale consisting of 45 items were administered to police personal for pilot testing.

Information and Communication Technology Adoption Scale (ICTAS) consists of different dimensions, namely - Performance Expectancy, Effort Expectancy, Social Influence,

Facilitating Resources, Anxiety, Self-Efficacy, Job Satisfaction, Workflow Efficiency, Behavioural Intention, Usage Behaviour. The scale aims to assess the Information and Communication Technology Adoption behaviour of police personal based on different dimensions, on a Likert scale, where 1 = Strongly Disagree, 2 = Disagree, 3 = Sometimes, 4 = Agree, and 5 = Strongly Agree.

## 3.4.2 Development of Investigative Forensic Tool Kit Adoption Scale (IFTKAS)

The Investigation Tool Kit Adoption Scale (ITKAS) was prepared based on the literature review. Items were formulated for each attribute of the Investigation Tool Kit Adoption Scale (ITKAS). The scale included thirty-two items that were accessed for language correction, vagueness, repetition, and redundancy. Finally, fifty-one items were retained to establish content validity, to check whether the scale incorporated all pertinent domains. Content validity was verified to determine whether the scale covered all aspects of technology adoption behaviour in policing.

The scale was given to seven experts to check content validity, and experts were provided with a checklist for identifying the item as relevant or non-relevant. After validation, some items marked as not relevant were removed. The scale consisting of 45 items were administered to police personal for pilot testing.

Investigation Tool Kit Adoption Scale (ITKAS) consists of different dimensions, namely - Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Resources, Anxiety, Self-Efficacy, Job Satisfaction, Workflow Efficiency, Behavioural Intention, Usage Behaviour. The scale aims to assess the Investigation Tool Kit Adoption behaviour of police personal based on different dimensions, on a Likert scale, where 1 = Strongly Disagree, 2 = Disagree, 3 = Sometimes, 4 = Agree, and 5 = Strongly Agree.

## 3.5. Pilot Study

A pilot study was conducted through a Scale survey comparing of the two scales, ICTAS and IFTKAS. For the pilot study, 65 police personnel were randomly selected from one of the police ranges. The sample respondents were distributed both the Scales and responses were compiled. Out of the 65 respondents, 47 were male police personnel and 18 were female police personnel. these police personnel were serving in urban and rural areas of the range. The data from the pilot was compiled and run for reliability and validity statistics. The reliability statistic, Cronbach's alpha and case processing details are presented in Table 2.

*Table 2 Reliability for ICTAS*

| Case Processing Summary | | N | % |
|---|---|---|---|
| Cases | Valid | 65 | 100.0 |
| | Excluded[a] | 0 | .0 |
| | Total | 65 | 100.0 |
| a. Listwise deletion based on all variables in the procedure. | | | |

| Reliability Statistics | |
|---|---|
| Cronbach's Alpha | N of Items |
| .934 | 10 |

**The Perason's Coefficient correlation are presented in Table 3 for validity check.**

*Table 3 Pearsons Coefficient correlations for Validity for ICTAS Scale*

| Correlations | | FC_T | SE_T | US_T | EE_T | SI_T | JS_T | WE_T | BI_T | AX_T | PE_T |
|---|---|---|---|---|---|---|---|---|---|---|---|
| FC_T | Pearson Correlation | 1 | | | | | | | | | |
| | Sig. (2-tailed) | | | | | | | | | | |
| | N | 65 | | | | | | | | | |
| SE_T | Pearson Correlation | .644[**] | 1 | | | | | | | | |
| | Sig. (2-tailed) | .000 | | | | | | | | | |
| | N | 65 | 65 | | | | | | | | |
| US_T | Pearson Correlation | .535[**] | .552[**] | 1 | | | | | | | |
| | Sig. (2-tailed) | .000 | .000 | | | | | | | | |
| | N | 65 | 65 | 65 | | | | | | | |
| EE_T | Pearson Correlation | .791[**] | .734[**] | .665[**] | 1 | | | | | | |
| | Sig. (2-tailed) | .000 | .000 | .000 | | | | | | | |
| | N | 65 | 65 | 65 | 65 | | | | | | |
| SI_T | Pearson Correlation | .685[**] | .695[**] | .746[**] | .742[**] | 1 | | | | | |
| | Sig. (2-tailed) | .000 | .000 | .000 | .000 | | | | | | |
| | N | 65 | 65 | 65 | 65 | 65 | | | | | |
| JS_T | Pearson Correlation | .638[**] | .831[**] | .555[**] | .667[**] | .712[**] | 1 | | | | |
| | Sig. (2-tailed) | .000 | .000 | .000 | .000 | .000 | | | | | |
| | N | 65 | 65 | 65 | 65 | 65 | 65 | | | | |
| WE_T | Pearson Correlation | .633[**] | .576[**] | .611[**] | .701[**] | .730[**] | .684[**] | 1 | | | |
| | Sig. (2-tailed) | .000 | .000 | .000 | .000 | .000 | .000 | | | | |
| | N | 65 | 65 | 65 | 65 | 65 | 65 | 65 | | | |

**Correlations**

| | | FC_T | SE_T | US_T | EE_T | SI_T | JS_T | WE_T | BI_T | AX_T | PE_T |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BI_T | Pearson Correlation | .464** | .392** | .851** | .582** | .637** | .524** | .706** | 1 | | |
| | Sig. (2-tailed) | .000 | .001 | .000 | .000 | .000 | .000 | .000 | | | |
| | N | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | | |
| AX_T | Pearson Correlation | .636** | .659** | .519** | .610** | .608** | .467** | .557** | .438** | 1 | |
| | Sig. (2-tailed) | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | | |
| | N | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | |
| PE_T | Pearson Correlation | .337** | .446** | .441** | .531** | .514** | .526** | .536** | .479** | .202 | 1 |
| | Sig. (2-tailed) | .006 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .106 | |
| | N | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 |
| **. Correlation is significant at the 0.01 level (2-tailed). | | | | | | | | | | | |

The reliability statistic, Cronbach's alpha and case processing details are presented in Table 4 for IFTKAS reliability.

*Table 4 Reliability for IFTKAS*

**Case Processing Summary**

| | | N | % |
|---|---|---|---|
| Cases | Valid | 65 | 100.0 |
| | Excluded[a] | 0 | .0 |
| | Total | 65 | 100.0 |
| a. Listwise deletion based on all variables in the procedure. | | | |

**Reliability Statistics**

| Cronbach's Alpha | N of Items |
|---|---|
| .922 | 10 |

The Perason's Coefficient correlation are presented in Table 5 for validity check for IFTKAS Scale.

*Table 5 Pearsons Coefficient correlations for Validity for IFTKAS Scale*

**Correlations**

| | | PE_T | EE_T | SI_T | FC_T | SE_T | JS_T | WE_T | AX_T | BI_T | US_T |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PE_T | Pearson Correlation | 1 | | | | | | | | | |
| | Sig. (2-tailed) | | | | | | | | | | |
| | N | 65 | | | | | | | | | |
| EE_T | Pearson Correlation | .340** | 1 | | | | | | | | |
| | Sig. (2-tailed) | .006 | | | | | | | | | |
| | N | 65 | 65 | | | | | | | | |
| SI_T | Pearson Correlation | .203 | .639** | 1 | | | | | | | |
| | Sig. (2-tailed) | .106 | .000 | | | | | | | | |
| | N | 65 | 65 | 65 | | | | | | | |
| FC_T | Pearson Correlation | .226 | .666** | .567** | 1 | | | | | | |
| | Sig. (2-tailed) | .070 | .000 | .000 | | | | | | | |
| | N | 65 | 65 | 65 | 65 | | | | | | |
| SE_T | Pearson Correlation | .119 | .476** | .548** | .551** | 1 | | | | | |
| | Sig. (2-tailed) | .345 | .000 | .000 | .000 | | | | | | |
| | N | 65 | 65 | 65 | 65 | 65 | | | | | |

| Correlations | | PE_T | EE_T | SI_T | FC_T | SE_T | JS_T | WE_T | AX_T | BI_T | US_T |
|---|---|---|---|---|---|---|---|---|---|---|---|
| JS_T | Pearson Correlation | .130 | .739** | .627** | .765** | .491** | 1 | | | | |
| | Sig. (2-tailed) | .302 | .000 | .000 | .000 | .000 | | | | | |
| | N | 65 | 65 | 65 | 65 | 65 | 65 | | | | |
| WE_T | Pearson Correlation | .215 | .789** | .733** | .713** | .370** | .786** | 1 | | | |
| | Sig. (2-tailed) | .085 | .000 | .000 | .000 | .002 | .000 | | | | |
| | N | 65 | 65 | 65 | 65 | 65 | 65 | 65 | | | |
| AX_T | Pearson Correlation | .114 | .547** | .514** | .676** | .637** | .661** | .480** | 1 | | |
| | Sig. (2-tailed) | .366 | .000 | .000 | .000 | .000 | .000 | .000 | | | |
| | N | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | | |
| BI_T | Pearson Correlation | .235 | .734** | .868** | .658** | .518** | .751** | .857** | .537** | 1 | |
| | Sig. (2-tailed) | .060 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | | |
| | N | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | |
| US_T | Pearson Correlation | .134 | .710** | .622** | .556** | .440** | .750** | .867** | .544** | .745** | 1 |
| | Sig. (2-tailed) | .286 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | |
| | N | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 |

**. Correlation is significant at the 0.01 level (2-tailed).

Once the reliability and validity of the scales were established, the data collection from the actual sample was commenced. The data was compiled using SPSS version 24 software. The invalid responses were identified and discarded. The SPSS software was used to draw statistics for descriptive and inferential data analysis. Independent samples t-test was utilized for demographic group wise differences and to record the significance of the differences in any. Similarly, ANOVA was utilized for demographic group wise differences and to record the significance of the differences in any.

## 3.6 Summary

This chapter presents the research design of the study in detail. To fulfill the objectives of the study, an in-depth exploration of the user behaviour (police personal behaviour) in terms of adopting a technology, a mixed method approach. This study used a sequential explanatory mixed-method approach involving two phases to explore the objectives of the study. The design involves combining the quantitative and qualitative aspects to comprehensively understand the user behaviour – the ICT adoption behaviour and the IFTK adoption behaviour. The findings from the

quantitative analysis help in understanding the perception of police personal towards adopting and using the ICT and IFTK. Qualitative data in the form of semi-structured interviews was used to explain and understand the important factors responsible for adopting and using the ICT and IFTK. Two scales have been developed for quantitative survey. The ICTAS has been designed to capture the perceived behaviour of the police personnel with respect to the determinants of the ICT Adoption. The IFTKAS has been designed to capture the perceived behaviour of the police personnel with respect to the determinants of the IFTK Adoption. The theoretical framework used for this study has been derived from the Unified Theory of Acceptance and Use of Technology (UTAUT). Some of the constructs have been borrowed from the original model and customized while others were added to suit the context of the study. The primary data for the study was collected from police personal across Rajasthan. The population and sample size would be determined the spatiality and the Rajasthan Police Organizational structure. Multi-phase sampling approach was used for the final sample selection. Once the reliability and validity of the scales were established, the data collection from the actual sample was commenced. The data was compiled using SPSS version 24 software. The invalid responses were identified and discarded. The SPSS software was used to draw statistics for descriptive and inferential data analysis. Independent samples t-test was utilized for demographic group wise differences and to record the significance of the differences in any. Similarly, ANOVA was utilized for demographic group wise differences and to record the significance of the differences in any.

# Chapter 4

# 4.Quantitative Data Analysis of ICT and IFTK Adoption

This chapter presents the results of the quantitative analysis carried out for ICT and IFTK Adoption. The chapter has been divided into two main sections, namely, Quantitative Data Analysis – ICT and Quantitative Data Analysis – IFTK.

## 4.1 Quantitative Data Analysis - ICT

This section presents the quantitative analysis carried out for ICT Adoption. The subsections include sample characteristics, Descriptive statistics, Normal distribution of data, demographic wise group differences for ICT adoption and demographic wise group differences for individual determiners of ICT adoption.

## 4.1.1 Sample Characteristics

Table 6 shows the demographic profile of the respondent police personnel in terms of their experience in police service. As can be observed from the table, the number of participants in all the categories is fairly uniform, with 23.2% and 32.5%. 23.5% and 20.8% of respondents in experience categories of less than 1 year, 1 to 5 years, 6 to 10 years, and more than 10 years, respectively.

Table 7 shows the demographic profile of the respondent police personnel in type of use of ICT – voluntary or mandatory. As can be observed from the table, the number of participants in the two categories is 63% and 37% respectively.

*Table 6 Experience Groups*

| EXP | | Frequency | Percent |
|---|---|---|---|
| Valid | Less than 1 Year | 67 | 23.2 |
| | 1 to 5 Years | 94 | 32.5 |
| | 6 to 10 Years | 68 | 23.5 |
| | More than 10 Years | 60 | 20.8 |
| | Total | 289 | 100.0 |

*Table 7 Voluntary/Mandatory Group*

| VMT | | Frequency | Percent |
|---|---|---|---|
| Valid | Voluntary | 182 | 63.0 |
| | Mandatory | 107 | 37.0 |
| | Total | 289 | 100.0 |

Table 8 shows the demographic profile of the respondent police personnel in terms of the position of the police personnel – Officers and Constabulary. As can be observed from the table, the number of participants in the two categories is 37.4% and 62.6% respectively.

Table 9 shows the demographic profile of the respondent police personnel in terms of their educational qualification. As can be observed from the table, the number of participants in all the categories is 24.6%, 42.6%. 17% and 15.9% of respondents in educational qualifications namely – Post graduate, graduate, 12th and 10th respectively. It can be seen here that almost 67 percent of the police personnel hold degrees of graduate and above.

*Table 8 Rank Groups*

| PPC | | Frequency | Percent |
|---|---|---|---|
| Valid | Officers | 108 | 37.4 |
| | Constabulary | 181 | 62.6 |
| | Total | 289 | 100.0 |

*Table 9 Education Level Groups*

| EDU | | Frequency | Percent |
|---|---|---|---|
| Valid | Post-Graduate | 71 | 24.6 |
| | Graduate | 123 | 42.6 |
| | 12th | 49 | 17.0 |
| | 10th | 46 | 15.9 |
| | Total | 289 | 100.0 |

Table 10 shows the demographic profile of the respondent police personnel in terms of the Gender of the police personnel – Male and Female. As can be observed from the table, the number of participants in the two categories is 67.1% and 32.9% respectively.

Table 11 shows the demographic profile of the respondent police personnel in terms of their place of work – Urban and rural. As can be observed from the table, the number of participants in the two categories is 60.2% and 39.8% respectively.

Table 12 shows the demographic profile of the respondent police personnel in terms of their age group. As can be observed from the table, the number of participants in all the categories is 24.2%, 34.3%, 24.2% and 17.3% in the age groups namely – 20 to 29 years, 30 to 39 years, 40 to 49 years and above 50 years respectively. It can be seen here that almost 50 percent of the police personnel are in the age group of 20 to 40 years.

*Table 10 Gender Groups*

| GEN | | Frequency | Percent |
|---|---|---|---|
| Valid | Male | 194 | 67.1 |
| | Female | 95 | 32.9 |
| | Total | 289 | 100.0 |

*Table 11  Place of Work Groups*

| POW | | Frequency | Percent |
|---|---|---|---|
| Valid | Urban | 174 | 60.2 |
| | Rural | 115 | 39.8 |
| | Total | 289 | 100.0 |

*Table 12 Age Groups*

| AGE | Frequency | Percent |
|---|---|---|
| Valid | 20-29 Years | 70 | 24.2 |
| | 30-39 Years | 99 | 34.3 |
| | 40-49 Years | 70 | 24.2 |
| | More Than 50 Years | 50 | 17.3 |
| | Total | 289 | 100.0 |

## 4.1.2 Descriptive Characteristics - ICT

Table 13 shows the descriptive statics of the ICT Adoption determinant variable. As can be seen from the table, the minimum score on all the dimensions of the ICT Determinant variable is 45.00 while the maximum=m score is 210.00. The mean score is 156.10 while the standard

deviation is 27.83. The skewness value for ICT Determinant is .703 while the kurtosis value is 1.024.

*Table 13 Descriptive Characteristics of the ICT Sample*

| | N | Min | Max | Mean | Std. Deviation | Skewness | | Kurtosis | |
|---|---|---|---|---|---|---|---|---|---|
| | Statistic | Statistic | Statistic | Statistic | Statistic | Statistic | Std. Error | Statistic | Std. Error |
| ICTA_T | 288 | 45.00 | 210.00 | 156.1042 | 27.83218 | -.703 | .144 | 1.024 | .286 |
| Valid N (listwise) | 288 | | | | | | | | |

## 4.1.3 Normal Distribution of Data

The skewness and kurtosis values were used to determine if the data were distributed normally. Cronbach's alpha was used to assess the scale's internal consistency. The skewness value for ICT Determinant is .703 while the kurtosis value is 1.024. Skewness measures the symmetry of the distribution of data. The data is symmetrically distributed if the spread is similar on both sides of the center. Kurtosis measures whether the data is heavy-tailed or light-tailed relative to a normal distribution. High value of kurtosis indicates heavy tails, or outliers whereas low value of kurtosis indicates light tails, or lack of outliers. According to Hair et al. (2010) and Bryne (2010) skewness value between -2 to +2 is accepted as normal and kurtosis value between -7 to +7 is acceptable.
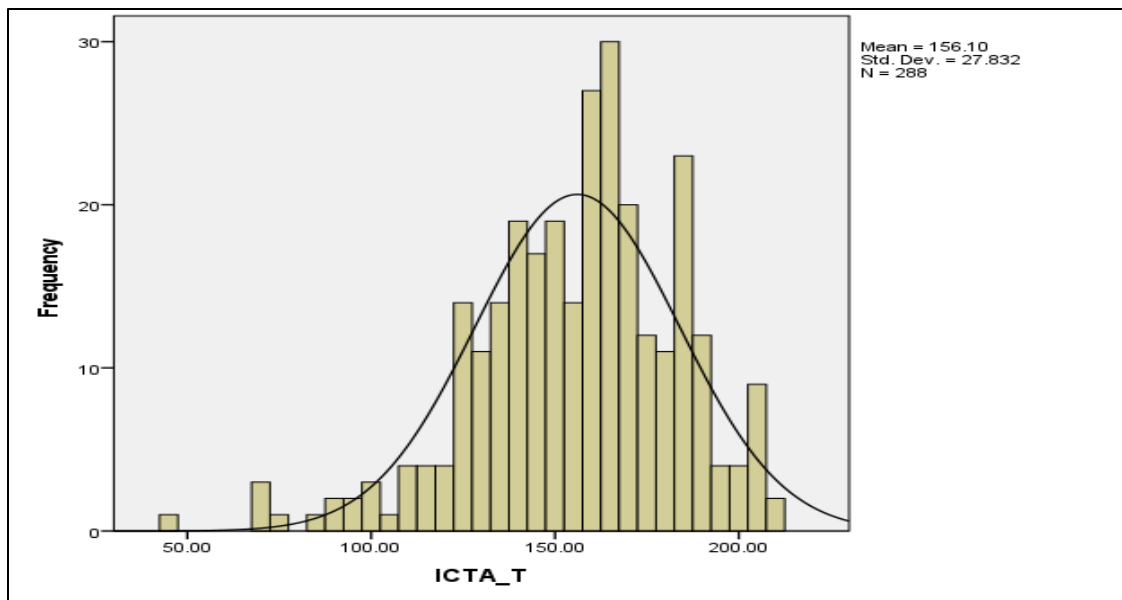
*Figure 16 Normal Distribution of Data for ICT Adoption*

## 4.1.4 Demographic Group Differences in ICT Adoption

## *Mode of Use*

Two groups were constituted for *Mode of Use* demographic moderating variable namely Voluntary use and Mandatory use. There were 181 respondents in Voluntary use while there were 107 respondents in Mandatory use category. The mean value of ICT Adoption for voluntary use group was 161.10 while the standard deviation for the same was 24.48 as can be seen from the Table 14. The mean value of ICT Adoption for Mandatory use group was 147.64 while the standard deviation for the same was 31.05 as can be seen from the Table. The table also shows that the t-value for the two groups is 4.072 at $p < .05$ level. This result indicates that there is significant difference between the two groups, the ones who use the ICT technology voluntary versus the ones who only use it in mandatory conditions. In the two scenarios, voluntary use and mandatory use, the self-motivation to engage technology in workforce becomes very important driver for adoption of technology.

**Table 14 Independent Samples Test- Mode of Use vs ICT_Adoption**

| Group Statistics | | | | | |
|---|---|---|---|---|---|
| | VMT | N | Mean | Std. Deviation | t |
| ICTA_T | Voluntary | 181 | 161.1050 | 24.48458 | 4.072* |
| | Mandatory | 107 | 147.6449 | 31.05481 | |

\* P< .05 level

# Gender

Two groups were constituted for *Gender* demographic moderating variable namely Male and Female. There were 194 respondents in Male group while there were 94 respondents in Female group. The mean value of ICT Adoption for male group was 153.69 while the standard deviation for the same was 27.22 while the same was 161.07 and 28.55 respectively for the female group as can be seen from the Table 15.  The table also shows that the t-value for the two groups is 2.122 and the p > .05 level. This result indicates that there is no significant difference between the two groups. It is indicative of the fact that when it comes to use of technology in the work, males and females are equally engaged with it.

**Table 15 Independent Samples Test- Gender vs ICT_Adoption**

| | T | T | Mean | Std. Deviation | T |
|---|---|---|---|---|---|
| ICTA_T | Male | 194 | 153.6959 | 27.22627 | 2.122 |
| | Female | 94 | 161.0745 | 28.55037 | |

P > .05 level

# Place of Work

Two groups were constituted for *Place of Work* demographic moderating variable namely Urban and Rural. There were 172 respondents in Urban group while there were 115 respondents in Rural group. The mean value of ICT Adoption for Urban group was 159.38 while the standard deviation for the same was 29.88 while the same was 151.15 and 23.84 respectively for the Rural group as can be seen from the Table 16.  The table also shows that the t-value for the two groups is 2.461 and the p < .05. This result indicates that there is significant difference between the two

groups. It is indicative of the fact that when it comes to use of technology in Urban and Rural geographies, the technology infrastructure and technology availability plays an important role.

*Table 16 Independent Samples Test- Place of Work vs ICT_Adoption*

|  | POW | N | Mean | Std. Deviation | T |
|---|---|---|---|---|---|
| ICTA_T | Urban | 172 | 159.3488 | 29.88703 | 2.461* |
|  | Rural | 115 | 151.1565 | 23.84732 |  |

\*    P< .05 level

## *Rank*

Two groups were constituted for *Rank* demographic moderating variable namely Officers and Constabulary. There were 107 respondents in Officers group while there were 181 respondents in Constabulary group. The mean value of ICT Adoption for male group was 164.92 while the standard deviation for the same was 28.82 while the same was 150.88 and 28.55 respectively for the constabulary group as can be seen from the Table 17.  The table also shows that the t-value for the two groups is 4.257 and the p value is .509. This result indicates that there is no significant difference between the two groups. It is indicative of the fact that when it comes to use of technology in the work, police personnel across ranks in the hierarchy use the technology with same intensity.

*Table 17 Independent Samples Test- Rank vs ICT_Adoption*

|  | PPC | N | Mean | Std. Deviation | T |
|---|---|---|---|---|---|
| ICTA_T | Officers | 107 | 164.9252 | 28.82795 | 4.257 |
|  | Constabulary | 181 | 150.8895 | 25.92508 |  |

p > .05 level

## *Experience*

Four groups were constituted for *Experience* demographic moderating variable namely less than 1 year, 1 to 5 years, 6 to 10 years, and more than 10 years.  The ANOVA results indicate that there was a significant difference between the groups. Table 18 also shows that the f-value for the

groups is 13.354, and the p-value is < .01 level. This result indicates that there is a significant difference between the groups. It is indicative of the fact that when it comes to the use of technology in the work, experience in the police service and with using technology is an important factor.

Table 18 ANOVA Group Differences Experience Groups vs ICT Adoption

| ANOVA | | | | |
|---|---|---|---|---|
| | Sum of Squares | Df | Mean Square | F |
| Between Groups | 27484.209 | 3 | 9161.403 | 13.354** |
| Within Groups | 194834.666 | 284 | 686.038 | |
| Total | 222318.875 | 287 | | |

** P< .01 level

## ANOVA: EDUCATION

Four groups were constituted for *Education* demographic moderating variable namely Post graduate, graduate, 12th and 10th. The ANOVA results indicate that there is no significant difference between the groups. Table 19 also shows that the f-value for the two groups is 1.410 and the p value is > .05 level. This result indicates that there is no significant difference between the groups. It is indicative of the fact that when it comes to use of technology in the work, educations is not an important factor.

Table 19 ANOVA Group Differences Education Groups vs ICT Adoption

| ANOVA | | | | |
|---|---|---|---|---|
| | Sum of Squares | Df | Mean Square | F |
| Between Groups | 3261.904 | 3 | 1087.301 | 1.410 |
| Within Groups | 219056.971 | 284 | 771.327 | |
| Total | 222318.875 | 287 | | |

p > .05 level

## *Age*

Four groups were constituted for *Age* demographic moderating variable namely 20 to 29 years, 30 to 39 years, 40 to 49 years and above 50 years. The ANOVA results indicate that there

is a significant difference between the groups. Table 20 also shows that the f-value for the groups is 2.714 and the p value is < .95 level. This result indicates that there is a significant difference between the groups. It is indicative of the fact that when it comes to use of technology in the work, age is an important factor.

*Table 20 ANOVA Group Differences Education Groups vs ICT Adoption*

| ANOVA | | | | |
|---|---|---|---|---|
| | Sum of Squares | Df | Mean Square | F |
| Between Groups | 6196.461 | 3 | 2065.487 | 2.714* |
| Within Groups | 216122.414 | 284 | 760.994 | |
| Total | 222318.875 | 287 | | |

\* P < .05 level

## 4.1.5. Dimension wise group differences for each demographic variable

### *Gender vs Dimensions*

Gender is an important construct to understanding the ICT acceptance behaviour of users. For a long time, the Police force has always been a male-dominated workforce. However, recent decades have seen women joining and playing an important role in the police workforce. Also, historically, women's access to ICT artifacts has been constrained due to various reasons. Table 21 shows that gender moderates the following determiners of ICT acceptance: Self-efficacy, Social Influence, ICT Usage, Job Satisfaction, Work Efficiency, and Behavioural Intention. The results indicate that there is a significant difference (t=2.055, p < .05 level) between male and female police personnel who adopt ICT such that female police personnel (Female: (M- 15.02, SD-2.80)) who believe in their abilities to use ICT are more likely to use ICT than their male counterparts (Male: (M- 14.20, SD-3.35)).

It can be observed that there is a significant difference (t=1.992, p < .05 level) between male and female police personnel who adopt ICT such that female police personnel (Female : (M-15.64, SD-3.22)) are more likely to use ICT than their male counterparts (Male : (M- 14.88, SD-2.96)). It can be observed that there is a significant difference (t=2.336, p < .05 level) between male and female police personnel who adopt ICT such that female police personnel (Female : (M-19.68, SD-3.94)) who are influenced by their peers and immediate social and professional group are more likely to use ICT than their male counterparts (Male : (M- 18.53, SD-3.91)). The results shows that there is a significant difference (t=2.193, p < .05 level) between male and female police personnel who adopt ICT such that female police personnel (Female: (M- 15.58, SD-2.89)) who believe that the use of ICT will lead to job satisfaction are more likely to use ICT than their male counterparts (Male : (M- 14.76, SD-3.03)).

*Table 21 Gender vs ICT Determiners*

|  | GEN | N | Mean | Std. Dev | t-Value |
|---|---|---|---|---|---|
| PE_T | Male | 194 | 17.7732 | 3.32678 | -1.177 |
|  | Female | 95 | 18.2526 | 3.09759 |  |
| FC_T | Male | 194 | 14.0206 | 3.59758 | -1.465 |
|  | Female | 95 | 14.6947 | 3.82899 |  |
| SE_T | Male | 194 | 14.2010 | 3.35712 | 2.055* |
|  | Female | 95 | 15.0211 | 2.80190 |  |
| US_T | Male | 194 | 14.8814 | 2.96287 | 1.992* |
|  | Female | 95 | 15.6421 | 3.22198 |  |
| SI_T | Male | 194 | 18.5361 | 3.91638 | 2.336* |
|  | Female | 95 | 19.6842 | 3.94177 |  |
| JS_T | Male | 194 | 14.7680 | 3.03739 | 2.193* |
|  | Female | 95 | 15.5895 | 2.89348 |  |
| WE_T | Male | 194 | 15.1856 | 3.03974 | 2.696** |
|  | Female | 95 | 16.2421 | 3.30607 |  |
| BI_T | Male | 194 | 15.3299 | 2.74936 | 2.035* |
|  | Female | 94 | 16.0745 | 3.22370 |  |
| EE_T | Male | 194 | 14.9794 | 3.90955 | 1.289 |
|  | Female | 95 | 15.5895 | 3.50226 |  |
| AX_T | Male | 194 | 14.0206 | 3.39148 | .842 |
|  | Female | 95 | 14.3789 | 3.41517 |  |

* p < .05 level, ** p < .01 level

The results show that there is a significant difference (t=2.696, p < .01 level) between male and female police personnel who adopt ICT such that female police personnel (Female: (M- 16.24,

SD-3.30)) who believe that the use of ICT will lead to work efficiency are more likely to use ICT than their male counterparts (Male: (M- 15.18, SD-3.03)). The results shows that there is a significant difference (t=2.035, p < .05 level) between male and female police personnel who adopt ICT such that female police personnel (Female: (M- 16.07, SD-3.22)) who believe that the positive intention to use ICT will lead to its use are more likely to use ICT than their male counterparts (Male: (M- 15.32, SD-2.74)).

However, the results also indicate that the group differences between male and female police personnel with respect to the role of Performance expectancy, Effort expectancy, facilitating conditions, and Anxiety are not significant, implying that these dimensions do not play an important role for police personnel to engage with ICT.

## *VM Mode vs Determiners of ICT Adoption*

The criterion of engaging and using the ICT in voluntary mode and mandatory mode is an important consideration to investigate in this research. The use of ICT in voluntary mode is more self-driven and outcome oriented while in mandatory mode the use of ICT is forced upon.

The results shown in Table 22 indicate that there is a significant difference (t=3.364, p < .01 level) between voluntary and mandatory police personnel users who encountered adequate facilitating conditions for the use of ICT such that voluntary police personnel (Voluntary : (M-14.79, SD-3.52)) are more likely to use ICT than their mandatory counterparts (Mandatory : (M-13.30, SD-3.76)).

The results indicate that there is a significant difference (t=2.823, p < .01 level) between voluntary and mandatory police personnel users who adopt ICT such that voluntary police personnel users (Voluntary: (M- 14.87, SD-2.85)) who believe in their abilities to use ICT are more likely to use ICT than their mandatory counterparts (Mandatory: (M- 13.78, SD-3.63)).

The results indicate that there is a significant difference (t=3.192, p < .01 level) between voluntary and mandatory police personnel users who adopt ICT such that voluntary police personnel users (Voluntary: (M- 15.56, SD-2.68)) are more likely to use ICT than their mandatory counterparts (Mandatory: (M- 14.39, SD-3.51)).

The results indicate that there is a significant difference (t=3.179, p < .01 level) between voluntary and mandatory police personnel users who adopt ICT such that voluntary police personnel users (Voluntary: (M- 15.71, SD-3.09)) who perceive that it is easy to use ICT and that it will take less effort are more likely to use ICT than their mandatory counterparts (Mandatory: (M- 14.27, SD-4.60)).

The results indicate that there is a significant difference (t=3.805, p < .01 level) between voluntary and mandatory police personnel users who adopt ICT such that voluntary police personnel users (Voluntary: (M- 19.57, SD-3.46)) who are positively influenced by their peer and social group to use ICT are more likely to use ICT than their mandatory counterparts (Mandatory: (M- 17.78, SD-4.47)).

The results indicate that there is a significant difference (t=2.955, p < .01 level) between voluntary and mandatory police personnel users who adopt ICT such that voluntary police personnel users (Voluntary: (M- 15.43, SD-2.76)) who believe that using ICT will positively lead

to job satisfaction are more likely to use ICT than their mandatory counterparts (Mandatory: (M-14.36, SD-3.28)).

The results indicate that there is a significant difference (t=3.700, p < .01 level) between voluntary and mandatory police personnel users who adopt ICT such that voluntary police personnel users (Voluntary: (M- 16.04, SD-3.05)) who believe that using ICT will positively lead to work efficiency more likely to use ICT than their mandatory counterparts (Mandatory: (M-14.65, SD-3.16)).

The results indicate that there is a significant difference (t=3.230, p < .01 level) between voluntary and mandatory police personnel users who adopt ICT such that voluntary police personnel users (Voluntary: (M- 15.99, SD-2.64)) who believe that a positive intention to use ICT will lead to higher ICT engagement at work are more likely to use ICT than their mandatory counterparts (Mandatory: (M- 14.85, SD-3.24)).

The results indicate that there is a significant difference (t=3.540, p < .01 level) between voluntary and mandatory police personnel users who adopt ICT such that voluntary police personnel users (Voluntary: (M- 14.67, SD-3.15)) who believe that being anxious is normal while using ICT and it is important to get familiar with it over time are more likely to use ICT than their mandatory counterparts (Mandatory: (M- 13.23, SD-3.62)).

The results indicate that there is a significant difference (t=3.854, p < .01 level) between voluntary and mandatory police personnel users who adopt ICT such that voluntary police personnel users (Voluntary: (M- 18.48, SD-2.84)) who believe that engaging with technology will

improve their performance are more likely to use ICT than their mandatory counterparts (Mandatory: (M- 16.99, SD-3.68)).

*Table 22 VM Mode vs ICT Determiners*

|  | VMT | N | Mean | Std. Deviation | t-Value |
|---|---|---|---|---|---|
| FC_T | Voluntary | 182 | 14.7912 | 3.52894 | 3.364** |
|  | Mandatory | 107 | 13.3084 | 3.76531 |  |
| SE_T | Voluntary | 182 | 14.8736 | 2.85573 | 2.823** |
|  | Mandatory | 107 | 13.7850 | 3.63429 |  |
| US_T | Voluntary | 182 | 15.5659 | 2.68278 | 3.192** |
|  | Mandatory | 107 | 14.3925 | 3.51750 |  |
| EE_T | Voluntary | 182 | 15.7143 | 3.09798 | 3.179** |
|  | Mandatory | 107 | 14.2710 | 4.60633 |  |
| SI_T | Voluntary | 182 | 19.5769 | 3.46125 | 3.805** |
|  | Mandatory | 107 | 17.7850 | 4.47220 |  |
| JS_T | Voluntary | 182 | 15.4341 | 2.76991 | 2.955** |
|  | Mandatory | 107 | 14.3645 | 3.28631 |  |
| WE_T | Voluntary | 182 | 16.0495 | 3.05254 | 3.700** |
|  | Mandatory | 107 | 14.6542 | 3.16854 |  |
| BI_T | Voluntary | 181 | 15.9945 | 2.64680 | 3.230** |
|  | Mandatory | 107 | 14.8598 | 3.24022 |  |
| AX_T | Voluntary | 182 | 14.6703 | 3.15022 | 3.540** |
|  | Mandatory | 107 | 13.2336 | 3.62012 |  |
| PE_T | Voluntary | 182 | 18.4835 | 2.84153 | 3.854** |
|  | Mandatory | 107 | 16.9907 | 3.68704 |  |

** $p < .01$ level

## *RANK vs Determiners of ICT Adoption*

The hierarchy of an organization plays an important role not only in creating role models for employees but also in inspiration and motivation to follow successful achievers. Moreover, employees tend to be influenced by those surrounding them in their immediate personal and professional networks. There are two rank groups used for this study, Officers and Constabulary.

The results in Table 23 indicate that there is a significant difference (t=2.324, p < .05 level) between Officer and Constabulary police personnel users who encountered adequate facilitating conditions for the use of ICT such that Officer police personnel (Officer : (M- 14.88, SD-4.02)) are more likely to use ICT than their Constabulary counterparts (Constabulary : (M- 13.85, SD-3.41)).

The results indicate that there is a significant difference (t=3.529, p < .01 level) between Officer and Constabulary police personnel users who adopt ICT such that Officer police personnel users (Officer: (M- 15.31, SD-3.08)) who believe in their abilities to use ICT are more likely to use ICT than their Constabulary counterparts (Constabulary: (M- 13.96, SD-3.17)).

The results indicate that there is a significant difference (t=3.341, p < .01 level) between Officer and Constabulary police personnel users who adopt ICT such that Officer police personnel users (Officer: (M- 15.89, SD-3.16)) are more likely to use ICT than their Constabulary counterparts (Constabulary: (M- 14.67, SD-2.92)).

The results indicate that there is a significant difference (t=4.040, p < .01 level) between Officer and Constabulary police personnel users who adopt ICT such that Officer police personnel users (Officer: (M- 16.31, SD-3.67)) who perceive that it is easy to use ICT and that it will take less effort are more likely to use ICT than their Constabulary counterparts (Constabulary: (M-14.50, SD-3.69)).

The results indicate that there is a significant difference (t=3.718, p < .01 level) between Officer and Constabulary police personnel users who adopt ICT such that Officer police personnel users (Officer: (M- 20.00, SD-4.30)) who are positively influenced by their peer and social group

to use ICT are more likely to use ICT than their Constabulary counterparts (Constabulary: (M-18.25, SD-3.58)).

The results indicate that there is a significant difference (t=3.667, p < .01 level) between Officer and Constabulary police personnel users who adopt ICT such that Officer police personnel users (Officer: (M- 15.86, SD-2.92)) who believe that using ICT will positively lead to job satisfaction are more likely to use ICT than their Constabulary counterparts (Constabulary: (M-14.54, SD-2.96)).

The results indicate that there is a significant difference (t=4.125, p < .01 level) between Officer and Constabulary police personnel users who adopt ICT such that Officer police personnel users (Officer: (M- 16.50, SD-3.17)) who believe that using ICT will positively lead to work efficiency more likely to use ICT than their Constabulary counterparts (Constabulary: (M- 14.95, SD-3.01)).

The results indicate that there is a significant difference (t=2.552, p < .05 level) between Officer and Constabulary police personnel users who adopt ICT such that Officer police personnel users (Officer: (M- 16.14, SD-2.96)) who believe that a positive intention to use ICT will lead to higher ICT engagement at work are more likely to use ICT than their Constabulary counterparts (Constabulary: (M- 15.23, SD-2.86)).

The results indicate that there is a significant difference (t=4.081, p < .01 level) between Officer and Constabulary police personnel users who adopt ICT such that Officer police personnel users (Officer: (M- 15.16, SD-3.35)) who believe that being anxious is normal while using ICT

and it is important to get familiar with it over time are more likely to use ICT than their Constabulary counterparts (Constabulary: (M- 13.52, SD-3.27)).

The results indicate that there is a significant difference (t=3.921, p < .01 level) between Officer and Constabulary police personnel users who adopt ICT such that Officer police personnel users (Officer: (M- 18.87, SD-3.22)) who believe that engaging with technology will improve their performance are more likely to use ICT than their Constabulary counterparts (Constabulary: (M- 17.36, SD-3.14)).

**Table 23 Rank vs ICT Determiners**

|  | PPC | N | Mean | Std. Deviation | T |
|---|---|---|---|---|---|
| FC_T | Officers | 108 | 14.8889 | 4.02871 | 2.324* |
|  | Constabulary | 181 | 13.8564 | 3.41261 |  |
| SE_T | Officers | 108 | 15.3148 | 3.08644 | 3.529** |
|  | Constabulary | 181 | 13.9669 | 3.17438 |  |
| US_T | Officers | 108 | 15.8981 | 3.16210 | 3.341** |
|  | Constabulary | 181 | 14.6740 | 2.92097 |  |
| EE_T | Officers | 108 | 16.3148 | 3.67016 | 4.040** |
|  | Constabulary | 181 | 14.5028 | 3.69929 |  |
| SI_T | Officers | 108 | 20.0093 | 4.30929 | 3.718** |
|  | Constabulary | 181 | 18.2597 | 3.58298 |  |
| JS_T | Officers | 108 | 15.8611 | 2.92095 | 3.667** |
|  | Constabulary | 181 | 14.5470 | 2.96353 |  |
| WE_T | Officers | 108 | 16.5000 | 3.17555 | 4.125** |
|  | Constabulary | 181 | 14.9558 | 3.01998 |  |
| BI_T | Officers | 107 | 16.1402 | 2.96663 | 2.552** |
|  | Constabulary | 181 | 15.2376 | 2.86044 |  |
| AX_T | Officers | 108 | 15.1667 | 3.35863 | 4.081** |
|  | Constabulary | 181 | 13.5249 | 3.27884 |  |
| PE_T | Officers | 108 | 18.8796 | 3.22582 | 3.921** |
|  | Constabulary | 181 | 17.3646 | 3.14813 |  |

* p < .05 level, ** p < .01 level

## *Place of Work vs Determiners of ICT Adoption*

Place of Work (PoW) is an important factor for any human resource. There are several aspects connected to the place of work, such as access to a place of work, infrastructure, the

comfort of work, distance from home and residence, distance from the main office, etc. There are two groups in this study related to place of work, namely, Urban and Rural.

The results shown in Table 24 indicate that there is a significant difference (t=2.118, p < .05 level) between Urban and Rural police personnel users who adopt ICT such that Urban police personnel users (Urban: (M- 14.79, SD-3.47)) who believe in their abilities to use ICT are more likely to use ICT than their Rural counterparts (Rural: (M- 13.98, SD-2.68)).

The results indicate that there is a significant difference (t=3.108, p < .01 level) between Urban and Rural police personnel users who adopt ICT such that Urban police personnel users (Urban: (M- 15.58, SD-3.14)) are more likely to use ICT than their Rural counterparts (Rural: (M- 14.45, SD-2.81)).

The results indicate that there is a significant difference (t=2.699, p < .01 level) between Urban and Rural police personnel users who adopt ICT such that Urban police personnel users (Urban: (M- 15.93, SD-3.41)) who believe that using ICT will positively lead to work efficiency more likely to use ICT than their Rural counterparts (Rural: (M- 14.92, SD-2.63)).

The results indicate that there is a significant difference (t=2.252, p < .05 level) between Urban and Rural police personnel users who adopt ICT such that Urban police personnel users (Urban: (M- 15.92, SD-3.08)) who believe that a positive intention to use ICT will lead to higher ICT engagement at work are more likely to use ICT than their Rural counterparts (Rural: (M- 15.04, SD-2.60)).

The results indicate that there is a significant difference (t=2.314, p < .05 level) between Urban and Rural police personnel users who adopt ICT such that Urban police personnel users (Urban: (M- 14.51, SD-3.53)) who believe that being anxious is normal while using ICT and it is important to get familiar with it over time are more likely to use ICT than their Rural counterparts (Rural: (M- 13.57, SD-3.11)).

The results indicate that there is a significant difference (t=2.345, p < .05 level) between Urban and Rural police personnel users who adopt ICT such that Urban police personnel users (Urban: (M- 18.29, SD-3.39)) who believe that engaging with technology will improve their performance are more likely to use ICT than their Rural counterparts (Rural: (M- 17.38, SD-2.96)).

The results also indicate that geographic setting of the police workforce don't play an important role in the perceived Facilitating conditions, Effort expectancy, Social influence, and job satisfaction.

*Table 24 Place of Work vs ICT Determiners*

|  | POW | N | Mean | Std. Dev | t-Value |
|---|---|---|---|---|---|
| FC_T | Urban | 174 | 14.4425 | 3.73154 | 1.138 |
|  | Rural | 115 | 13.9391 | 3.60138 |  |
| SE_T | Urban | 174 | 14.7931 | 3.47622 | 2.118* |
|  | Rural | 115 | 13.9826 | 2.68192 |  |
| US_T | Urban | 174 | 15.5805 | 3.14980 | 3.108** |
|  | Rural | 115 | 14.4522 | 2.81364 |  |
| EE_T | Urban | 174 | 15.4138 | 3.56946 | 1.293 |
|  | Rural | 115 | 14.8261 | 4.08089 |  |
| SI_T | Urban | 174 | 19.2644 | 4.16276 | 1.863 |
|  | Rural | 115 | 18.3826 | 3.57030 |  |
| JS_T | Urban | 174 | 15.2931 | 3.19687 | 1.778 |
|  | Rural | 115 | 14.6522 | 2.67229 |  |
| WE_T | Urban | 174 | 15.9368 | 3.41393 | 2.699** |
|  | Rural | 115 | 14.9217 | 2.63960 |  |
| BI_T | Urban | 173 | 15.9249 | 3.08034 | 2.525* |
|  | Rural | 115 | 15.0435 | 2.60698 |  |
| AX_T | Urban | 174 | 14.5115 | 3.53306 | 2.314* |
|  | Rural | 115 | 13.5739 | 3.11212 |  |
| PE_T | Urban | 174 | 18.2931 | 3.39504 | 2.345* |
|  | Rural | 115 | 17.3826 | 2.96347 |  |

* p < .05 level, ** p < .01 level

## *Experience vs Determiners of ICT Adoption*

Experience is an important factor when considered in the workplace. Employees with longer work experience tend to carry out the task in a more nuanced manner. For the purpose of this research, four groups were used to see the effect of experience with respect to the dimensions. Results shown in Table 25 indicate that there were significant differences between groups with respect to all the determiners of behavioral intention to use ICT. Facilitating conditions were more important for police personnel with experience of 10 years and above as compared to those who had less experience. This can be attributed to the fact that younger generations' exposure to ICT happens at an early stage, and they are more proficient with ICT artifacts. Similarly, police personnel with an experience bracket of 10 years and above give more significance to self-capabilities (SE), ICT usage (US), Effort requirement for use of ICT (EE), Influence of their social network (SI), Job Satisfaction (JS), Efficiency at work (WE), Intention to use ICT (BI), Anxiety while using ICT (AX) and improvement in performance when using ICT (PE) as compared to police personnel with less experience.

*Table 25 Place of Work vs ICT Determiners*

|       |                | Sum of Sq | Df  | Mean Square | F          |
|-------|----------------|-----------|-----|-------------|------------|
| FC_T  | Between Groups | 173.360   | 3   | 57.787      | 4.413**    |
|       | Within Groups  | 3731.685  | 285 | 13.094      |            |
| SE_T  | Between Groups | 267.163   | 3   | 89.054      | 9.439**    |
|       | Within Groups  | 2688.837  | 285 | 9.435       |            |
| US_T  | Between Groups | 266.335   | 3   | 88.778      | 10.367**   |
|       | Within Groups  | 2440.668  | 285 | 8.564       |            |
| EE_T  | Between Groups | 208.325   | 3   | 69.442      | 5.051**    |
|       | Within Groups  | 3918.319  | 285 | 13.748      |            |
| SI_T  | Between Groups | 393.662   | 3   | 131.221     | 9.097**    |
|       | Within Groups  | 4111.175  | 285 | 14.425      |            |
| JS_T  | Between Groups | 323.784   | 3   | 107.928     | 13.451**   |
|       | Within Groups  | 2286.798  | 285 | 8.024       |            |
| WE_T  | Between Groups | 368.549   | 3   | 122.850     | 13.930**   |
|       | Within Groups  | 2513.388  | 285 | 8.819       |            |
| BI_T  | Between Groups | 218.040   | 3   | 72.680      | 9.205**    |
|       | Within Groups  | 2242.429  | 284 | 7.896       |            |
| AX_T  | Between Groups | 356.372   | 3   | 118.791     | 11.406**   |
|       | Within Groups  | 2968.091  | 285 | 10.414      |            |
| PE_T  | Between Groups | 295.949   | 3   | 98.650      | 10.199**   |
|       | Within Groups  | 2756.667  | 285 | 9.673       |            |

** $P < .01$ Level

# *Age vs Determiners of ICT Adoption*

Age is an important factor when considered in the workplace. Employees with longer work Age tend to carry out the task in a more nuanced manner. For the purpose of this research, four groups were used to see the effect of Age with respect to the dimensions. Results in Table 26 indicate that there were significant differences between groups with respect to some of the determiners of adoption of ICT.

Police personnel with an Age bracket of 40 years and above give more significance to ICT usage (US), Job Satisfaction (JS), Efficiency at work (WE), and Intention to use ICT (BI) as compared to police personnel of the age group 40 and below. However, for Facilitating Conditions (FC), self-capabilities (SE), Effort requirement for the use of ICT (EE), Influence of their social network (SI), Anxiety while using ICT (AX), and improvement in performance when using ICT (PE), determiners, there was no significant difference between these groups.

*Table 26 Place of Work vs ICT Determiners*

|  |  | Sum of Sqs | Df | Mean Square | F |
|---|---|---|---|---|---|
| FC_T | Between Groups | 44.903 | 3 | 14.968 | 1.105 |
|  | Within Groups | 3860.142 | 285 | 13.544 |  |
| SE_T | Between Groups | 49.176 | 3 | 16.392 | 1.607 |
|  | Within Groups | 2906.824 | 285 | 10.199 |  |
| US_T | Between Groups | 88.275 | 3 | 29.425 | 3.202* |
|  | Within Groups | 2618.729 | 285 | 9.189 |  |
| EE_T | Between Groups | 68.381 | 3 | 22.794 | 1.601 |
|  | Within Groups | 4058.263 | 285 | 14.240 |  |
| SI_T | Between Groups | 118.567 | 3 | 39.522 | 2.568 |
|  | Within Groups | 4386.270 | 285 | 15.390 |  |
| JS_T | Between Groups | 90.142 | 3 | 30.047 | 3.398* |
|  | Within Groups | 2520.440 | 285 | 8.844 |  |
| WE_T | Between Groups | 82.856 | 3 | 27.619 | 2.812* |
|  | Within Groups | 2799.082 | 285 | 9.821 |  |
| BI_T | Between Groups | 93.532 | 3 | 31.177 | 3.741* |
|  | Within Groups | 2366.937 | 284 | 8.334 |  |
| AX_T | Between Groups | 23.185 | 3 | 7.728 | .667 |
|  | Within Groups | 3301.279 | 285 | 11.583 |  |
| PE_T | Between Groups | 76.100 | 3 | 25.367 | 2.429 |
|  | Within Groups | 2976.515 | 285 | 10.444 |  |

* $P < .01$ Level

# *Education vs Determiners of ICT Adoption*

Education is an important factor when considered in the workplace. Employees with higher educational qualifications are considered long-term and valuable assets for the organization. They are also suitable for specialized tasks as they possess specialized training as a result of their qualification. For the purpose of this research, four groups were used to see the effect of educational qualification with respect to the dimensions. Results in Table 27 indicate that there were significant differences between groups with respect to some of the determiners of the adoption of ICT.

Police personnel with an educational qualification of graduate and above give more significance to Job Satisfaction (JS) and Efficiency at work (WE), as compared to police personnel of the age group 40 and below. However, for Facilitating Conditions (FC), self-capabilities (SE), Effort requirement for the use of ICT (EE), ICT usage (US), Influence of their social network (SI), Anxiety while using ICT (AX), Intention to use ICT (BI) and improvement in performance when using ICT (PE), determiners, there was no significant difference between these groups.

This can be attributed to the reason that irrespective of the educational qualification, ICT has been routinized in our personal lives. The users are exposed from very early during school education to ICT now. For those users who are aged borrow from their experiences to learn the ICT and integrate it in their work tasks.

Table 27 Education vs ICT Determiners

|  |  | Sum of Sq | Df | Mean Square | F |
|---|---|---|---|---|---|
| FC_T | Between Groups | 21.421 | 3 | 7.140 | .524 |
|  | Within Groups | 3883.624 | 285 | 13.627 |  |
| SE_T | Between Groups | 21.562 | 3 | 7.187 | .698 |
|  | Within Groups | 2934.438 | 285 | 10.296 |  |
| US_T | Between Groups | 71.469 | 3 | 23.823 | 2.576 |
|  | Within Groups | 2635.535 | 285 | 9.247 |  |
| EE_T | Between Groups | 15.378 | 3 | 5.126 | .355 |
|  | Within Groups | 4111.265 | 285 | 14.425 |  |
| SI_T | Between Groups | 94.733 | 3 | 31.578 | 2.041 |
|  | Within Groups | 4410.105 | 285 | 15.474 |  |
| JS_T | Between Groups | 83.305 | 3 | 27.768 | 3.131* |
|  | Within Groups | 2527.276 | 285 | 8.868 |  |
| WE_T | Between Groups | 78.088 | 3 | 26.029 | 2.646* |
|  | Within Groups | 2803.850 | 285 | 9.838 |  |
| BI_T | Between Groups | 21.159 | 3 | 7.053 | .821 |
|  | Within Groups | 2439.310 | 284 | 8.589 |  |
| AX_T | Between Groups | 42.366 | 3 | 14.122 | 1.226 |
|  | Within Groups | 3282.097 | 285 | 11.516 |  |
| PE_T | Between Groups | 31.876 | 3 | 10.625 | 1.002 |
|  | Within Groups | 3020.740 | 285 | 10.599 |  |

## 4.2 Quantitative Data Analysis – IFTK Adoption

This section presents the quantitative analysis carried out for IFTK Adoption. The subsections include sample characteristics, Descriptive statistics, Normal distribution of data, demographic wise group differences for IFTK adoption and demographic wise group differences for individual determiners of IFTK adoption.

## 4.2.1 Sample Characteristics

Table 28 shows the demographic profile of the respondent police personnel in terms of their experience in service. As can be observed from the table, the number of participants is 26.9%, 33.7 %, 22.7% and 16.8% in the experience groups – less than 1 year, 1 to 5 years, 6 to 10 years and more than 10 years respectively. It can be seen here that almost 63.6 percent of the police personnel are in the experience group of upto 1 year and 5 years.

Table 29 shows the demographic profile of the respondent police personnel in type of use of ICT – voluntary or mandatory. As can be observed from the table, the number of participants in the two categories is 61.8% and 38.2%, respectively.

**Table 28 Experience Groups**

| EXP | | Frequency | Percent |
|---|---|---|---|
| Valid | Less than 1 Year | 83 | 26.9 |
| | 1 to 5 Years | 104 | 33.7 |
| | 6 to 10 Years | 70 | 22.7 |
| | More than 10 Years | 52 | 16.8 |
| | Total | 309 | 100.0 |

**Table 29 Mode of Use Groups**

| VMT | | Frequency | Percent |
|---|---|---|---|
| Valid | Voluntary | 191 | 61.8 |
| | Mandatory | 118 | 38.2 |
| | Total | 309 | 100.0 |

Table 30 shows the demographic profile of the respondent police personnel in terms of their position in rank – Constabulary and Officers. As can be observed from the table, the number of participants in the two categories is 69.9% and 30.1% respectively.

Table 31 shows the demographic profile of the respondent police personnel in terms of their educational qualification. As can be observed from the table, the number of participants in all the categories is 18.1%, 43.4%. 22.7% and 15.9% of respondents in educational qualifications namely – Post graduate, graduate, 12th and 10th respectively. It can be seen here that almost 62 percent of the police personnel hold degrees of graduate and above.

**Table 30 Education Groups**

| EDU | | Frequency | Percent |
|---|---|---|---|
| Valid | Post-Graduate | 56 | 18.1 |
| | Graduate | 134 | 43.4 |
| | 12th | 70 | 22.7 |
| | 10th | 49 | 15.9 |
| | Total | 309 | 100.0 |

**Table 31 Rank Groups**

| PPC | | Frequency | Percent |
|---|---|---|---|
| Valid | Officers | 93 | 30.1 |
| | Constabulary | 216 | 69.9 |
| | Total | 309 | 100.0 |

Table 32 shows the demographic profile of the respondent police personnel in terms of the Gender of the police personnel – Male and Female. As can be observed from the table, the number of participants in the two categories is 59.2% and 40.8% respectively.

Table 33 shows the demographic profile of the respondent police personnel in terms of their age group. As can be observed from the table, the number of participants in all the categories is 23.6%, 28.8%, 26.2% and 21.4% in the age groups namely – 20 to 29 years, 30 to 39 years, 40 to 49 years and above 50 years respectively. It can be seen here that almost 52.4 percent of the police personnel are in the age group of 20 to 40 years.

*Table 32 Gender Groups*

| GEN | | Frequency | Percent |
|---|---|---|---|
| Valid | Male | 183 | 59.2 |
| | Female | 126 | 40.8 |
| | Total | 309 | 100.0 |

*Table 33 Age Groups*

| AGE | | Frequency | Percent |
|---|---|---|---|
| Valid | 20-29 Years | 73 | 23.6 |
| | 30-39 Years | 89 | 28.8 |
| | 40-49 Years | 81 | 26.2 |
| | More Than 50 Years | 66 | 21.4 |
| | Total | 309 | 100.0 |

Table 34 shows the demographic profile of the respondent police personnel in terms of their place of work – Urban and rural. As can be observed from the table, the number of participants in the two categories is 63.4% and 36.6% respectively.

Table 35 shows the demographic profile of the respondent police personnel in terms of number of investigations done using IFTK by police personnel. As can be observed from the table, the number of participants in all the categories is 81.6%, 8.7%, 2.3% and 7.4% in the groups namely – more than 10, more than 20, more than 30 and more than 40. It can be seen here that a high majority of police personnel has carried out only between 10 to 20 investigations using IFTK.

| **Table 34 Place of Work Groups** | | | | **Table 35 Number of Investigations Done using IFTK** | | | |

| POW | | | |
|---|---|---|---|
| | | Frequency | Percent |
| Valid | Urban | 196 | 63.4 |
| | Rural | 113 | 36.6 |
| | Total | 309 | 100.0 |

| NOI | | | |
|---|---|---|---|
| | | Frequency | Percent |
| Valid | More than 10 | 252 | 81.6 |
| | More than 20 | 27 | 8.7 |
| | More than 30 | 7 | 2.3 |
| | More than 40 | 23 | 7.4 |
| | Total | 309 | 100.0 |

Table 36 shows the demographic profile of the respondent police personnel in terms of frequency of use of IFTK. As can be observed from the table, the number of participants in all the categories is 25.2%, 27.8%, 24.9% and 22% in the groups namely – Never, sometimes, Often and Always.

Table 37 shows the demographic profile of the respondent police personnel in terms of availability of toolkits in their workplace – Yes and No. As can be observed from the table, the number of participants in the two categories is 674.8% and 25.2%, respectively.

| **Table 36 Frequency of Use Groups** | | | | **Table 37 Availability of Toolkit Groups** | | | |

| NOU | | | |
|---|---|---|---|
| | | Frequency | Percent |
| Valid | Never | 78 | 25.2 |
| | Sometimes | 86 | 27.8 |
| | Often | 77 | 24.9 |
| | Always | 68 | 22.0 |
| | Total | 309 | 100.0 |

| AOT | | | |
|---|---|---|---|
| | | Frequency | Percent |
| Valid | YES | 231 | 74.8 |
| | NO | 78 | 25.2 |
| | Total | 309 | 100.0 |

Table 38 shows the demographic profile of the respondent police personnel in terms of training received – Yes and No. As can be observed from the table, the number of participants in the two categories is 44.3% and 55.7% respectively.

Table 39 shows the demographic profile of the respondent police personnel in terms of their belief that IFTK is useful or not – Yes and No. As can be observed from the table, the number of participants in the two categories is 42.1% and 57.9% respectively.

Table 40 shows the demographic profile of the respondent police personnel in terms of their belief that IFTK is significant tool in crime solving – Yes and No. As can be observed from the table, the number of participants in the two categories is 46.0% and 54.0% respectively.

*Table 38 Training Groups*

| TRN | | Freq | Percent |
|---|---|---|---|
| Valid | YES | 137 | 44.3 |
| | NO | 172 | 55.7 |
| | Total | 309 | 100.0 |

*Table 39 Perceived Usefulness Groups*

| USE | | Freq | Percent |
|---|---|---|---|
| Valid | NO | 130 | 42.1 |
| | YES | 179 | 57.9 |
| | Total | 309 | 100.0 |

*Table 40 Perceived Usefulness Groups*

| SIG | | Freq | Percent |
|---|---|---|---|
| Valid | NO | 142 | 46.0 |
| | YES | 167 | 54.0 |
| | Total | 309 | 100.0 |

## 4.2.2 Descriptives for IFTK Toolkit

Table 41 shows the descriptive statics of the IFTK Adoption determinant variable. As can be seen from the table, the minimum score on all the dimensions of the IFTK Determinant variable is 45.00, while the maximum score is 240.00. The mean score is 152.90, while the standard deviation is 29.49. The skewness value for ICT Determinant is .417, while the kurtosis value is .787.

*Table 41 Descriptive Statistics for IFTK Adoption*

| Descriptive Statistics | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | N | Minimum | Maximum | Mean | Std. Deviation | Variance | Skewness | Kurtosis |
| | Statistic | Statistic | Statistic | Statistic | Statistic | Statistic | Statistic | Statistic |
| ITKA_T | 309 | 45.00 | 240.00 | 152.9061 | 29.49875 | 870.176 | -.417 | .787 |
| Valid N (listwise) | 309 | | | | | | | |

## 4.2.3 Normal Distribution of Data

The skewness and kurtosis values were used to determine if the data were distributed normally. Cronbach's alpha was used to assess the scale's internal consistency. The skewness value for ICT Determinant is .417 while the kurtosis value is 787. Skewness measures the symmetry of the distribution of data. The data is symmetrically distributed if the spread is similar on both sides of the center. Kurtosis measures whether the data is heavy-tailed or light-tailed relative to a normal distribution. The high value of kurtosis indicates heavy tails or outliers, whereas the low value of kurtosis indicates light tails or lack of outliers. According to Hair et al. (2010) and Bryne (2010), a skewness value between -2 and +2 is accepted as normal, and a kurtosis value between -7 and +7 is acceptable.
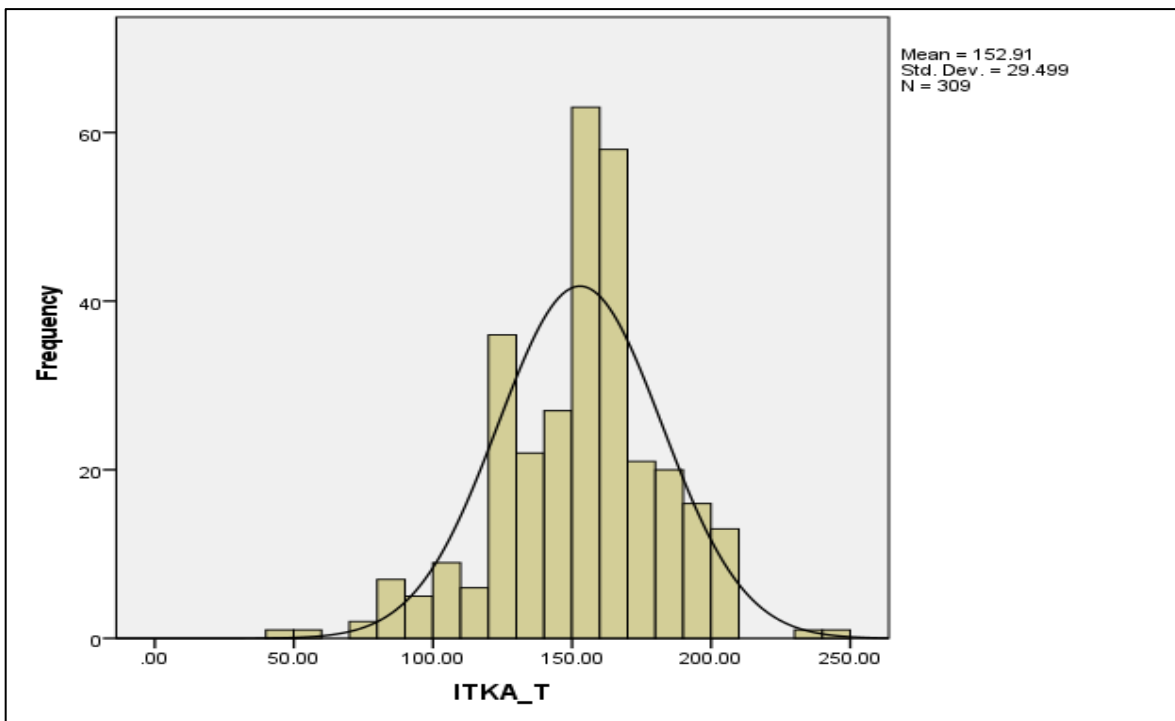


*Figure 17 Normal Distribution for IFTK Adoption*

## 4.2.4 Demographic Group Differences in IFTK Adoption

## *Mode of Use vs IFTK Adoption*

Two groups were constituted for *Mode of Use* demographic moderating variable namely Voluntary use and Mandatory use. There were 191 respondents in Voluntary use while there were 118 respondents in Mandatory use category. The mean value of IFTK Adoption for voluntary use group was 156.28 while the standard deviation for the same was 30.38 as can be seen from the Table 42. The mean value of IFTK Adoption for Mandatory use group was 147.44 while the standard deviation for the same was 27.24 as can be seen from the Table. The table also shows that the t-value for the two groups is 2.583 and the p value is .010. This result indicates that there is significant difference between the two groups, the ones who use the IFTK technology voluntary versus the ones who only use it in mandatory conditions. In the two scenarios, voluntary use and mandatory use, the self-motivation to engage technology in workforce becomes very important driver for adoption of technology.

*Table 42 Independent Samples Test- Mode of Use vs IFTK Adoption*

|  | VMT | N | Mean | Std. Deviation | t |
|---|---|---|---|---|---|
| ITKA_T | Voluntary | 191 | 156.2827 | 30.38808 | 2.583* |
|  | Mandatory | 118 | 147.4407 | 27.24675 |  |

* p < .05 Level

## *Rank vs IFTK Adoption*

Two groups were constituted for *Rank* demographic moderating variable namely Officers and Constabulary. There were 93 respondents in Officers group while there were 216 respondents in Constabulary group. The mean value of IFTK Adoption for Officers group was 161.94 while the standard deviation for the same was 26.37 while the same was 149.01 and 29.97 respectively for the constabulary group as can be seen from the Table 43. The table also shows that the t-value for the two groups is 3.603 and the p value is .000. This result indicates that there is significant difference between the two groups. It is indicative of the fact that when it comes to use of technology in the work, police personnel at higher rank in the hierarchy use the technology with more intensity than those in the lower ranks.

**Table 43 Independent Samples Test- Rank vs IFTK Adoption**

|  | PPC | N | Mean | Std. Deviation | t |
|---|---|---|---|---|---|
| ITKA_T | Officers | 93 | 161.9462 | 26.37372 |  |
|  | Constabulary | 216 | 149.0139 | 29.97278 | .3.603** |

** p < .01 Level

## *Gender vs IFTK Adoption*

Two groups were constituted for *Gender* demographic moderating variable namely Male and Female. There were 182 respondents in Male group while there were 125 respondents in Female group. The mean value of IFTK Adoption for male group was 150.72 while the standard deviation for the same was 31.13 while the same was 155.49 and 26.67 respectively for the female group as can be seen from the Table 44. The table also shows that the t-value for the two groups is 1.397 and the p > .05 level. This result indicates that there is no significant difference between the two groups. It is indicative of the fact that when it comes to use of technology in the work, males and females are equally engaged with it.

Table 44 Independent Samples Test- Gender vs IFTK Adoption

| | GENDER | N | Mean | Std. Deviation | t |
|---|---|---|---|---|---|
| ITKA_T | Male | 182 | 150.7253 | 31.13172 | 1.397 |
| | Female | 125 | 155.4960 | 26.67142 | |

p > .05 Level

## *Place of Work vs IFTK Adoption*

Two groups were constituted for *Place of Work* demographic moderating variable namely Urban and Rural. There were 195 respondents in Urban group while there were 111 respondents in Rural group. The mean value of IFTK Adoption for Urban group was 158.90 while the standard deviation for the same was 27.18 while the same was 149.12 and 30.22 respectively for the Rural group as can be seen from the Table 45.  The table also shows that the t-value for the two groups is 2.819 and the p value is .005. This result indicates that there is significant difference between the two groups. It is indicative of the fact that when it comes to use of technology in Urban and Rural geographies, the technology infrastructure and technology availability plays an important role.

Table 45 Independent Samples Test- Place of Work vs IFTK Adoption

| | POW | N | Mean | Std. Deviation | t |
|---|---|---|---|---|---|
| ITKA_T | Urban | 195 | 158.9009 | 30.22014 | 2.819** |
| | Rural | 111 | 149.1282 | 27.18788 | |

** p < .01 Level

## *Availability of Toolkit vs IFTK Adoption*

Two groups were constituted for *Availability of Toolkit* demographic moderating variable namely Yes and No. There were 231 respondents in Yes while there were 78 respondents in No category. The mean value of ICT Adoption for Yes group was 154.64 while the standard deviation for the same was 30.04 as can be seen from the Table 46.  The mean value for No group was 147.74 while the standard deviation for the same was 27.36 as can be seen from the Table. The

table also shows that the t-value for the two groups is 1.794 and the p > .05 level. This result indicates that there is no significant difference between the two groups, the ones who have the toolkit readily available and for those where the toolkit is not readily available.

**Table 46 Independent Samples Test- Availability of IFTK vs IFTK Adoption**

|  | AOT | N | Mean | Std. Deviation | T | Sig |
|---|---|---|---|---|---|---|
| ITKA_T | YES | 231 | 154.6494 | 30.04190 | 1.794 | .074 |
|  | NO | 78 | 147.7436 | 27.36356 |  |  |

P > .05 Level

## *IFTK Training vs IFTK Adoption*

Two groups were constituted for *Training for Toolkit* demographic moderating variable namely Yes and No. There were 134 respondents in Yes group while there were 172 respondents in No group. The mean value of ICT Adoption for Yes group was 161.41 while the standard deviation for the same was 29.62, as seen from the Table. The mean value of ICT Adoption for No group was 146.50 while the standard deviation for the same was 27.95 as can be seen from the Table 47. The table also shows that the t-value for the two groups is 4.507 and the p < .01 level. This result indicates that there is significant difference between the two groups, the ones who have the toolkit training and the ones who don't have the training. This implies that in-service continuous training will help the police personnel to keep themselves updated and motivate them to use technology.

**Table 47 Independent Samples Test- IFTK Training vs IFTK Adoption**

|  | TRN | N | Mean | Std. Deviation | T |
|---|---|---|---|---|---|
| ITKA_T | YES | 134 | 161.4104 | 29.62807 | 4.507** |
|  | NO | 172 | 146.5058 | 27.95788 |  |

** p < .01 level

## *Perceived Usefulness vs IFTK Adoption*

Two groups were constituted for *Perceived Usefulness* demographic moderating variable namely Yes and No. There were 157 respondents in Yes group while there were 141 respondents in No group. The mean value for Yes group was 157.54 while the standard deviation for the same was 30.15 as can be seen from the Table 48. The mean value No group was 149.78 while the standard deviation for the same was 27.23 as can be seen from the Table. The table also shows that the t-value for the two groups is 2.320 and the $p < .05$ level. This result indicates that there is significant difference between the two groups, the ones who use the toolkit more frequently than thos who use it less frequently.

*Table 48 Independent Samples Test- No of Times IFTK Used vs IFTK Adoption*

|        | USE | N   | Mean     | Std. Deviation | t      |
|--------|-----|-----|----------|----------------|--------|
| ITKA_T | NO  | 141 | 149.7872 | 27.23464       | 2.320* |
|        | YES | 157 | 157.5414 | 30.15377       |        |

\* $p < .05$ Level

## *Perceived Significance of IFTK vs IFTK Adoption*

Two groups were constituted for *Significance of Toolkit* demographic moderating variable namely Yes and No. There were 55 respondents in Yes group while there were 251 respondents in No group. The mean value of ICT Adoption for Yes group was 152.54 while the standard deviation for the same was 25.68 as can be seen from the Table 49. The mean value of IFTK Adoption for N0 group was 153.15 while the standard deviation for the same was 30.42 as can be seen from the Table. The table also shows that the t-value for the two groups is .137 and the $p > .05$ level. This result indicates that there is no significant difference between the two groups, the ones who believe that the toolkit is a significant technology for crime detection and those who don't disbelieve the same.

|  | SIG | N | Mean | Std. Deviation | t |
|---|---|---|---|---|---|
| ITKA_T | NO | 251 | 153.1514 | 30.42409 | .137 |
|  | YES | 55 | 152.5455 | 25.68601 |  |

P > .05 Level

## Age Groups vs IFTK Adoption

Four groups were constituted for *Age* demographic moderating variable namely 20 to 29 years, 30 to 39 years, 40 to 49 years and above 50 years. The ANOVA results in Table 50 indicate that there is significant difference between the groups. Table also shows that the f-value for the two groups is .907 and the p > .05 level. This result indicates that there is no significant difference between the groups. It is indicative of the fact that when it comes to use of IFTK in the work, age is not an important factor.

*Table 50 ANOVA Age vs IFTK Adoption*

|  | Sum of Squares | Df | Mean Square | F |
|---|---|---|---|---|
| Between Groups | 2370.596 | 3 | 790.199 | .907 |
| Within Groups | 265643.682 | 305 | 870.963 |  |
| Total | 268014.278 | 308 |  |  |

p > .05 Level

## Education Level Groups vs IFTK Adoption

Four groups were constituted for *Education* demographic moderating variable namely Post graduate, graduate, $12^{th}$ and $10^{th}$. The ANOVA results in Table 51 indicate that there is significant difference between the groups. The table also shows that the f-value for the two groups is 3.192 and the p < .05 level. This result indicates that there is a significant difference between the groups. It indicates that when it comes to use of technology in the work, education is an important factor.

*Table 51 ANOVA Education level vs IFTK Adoption*

|  | Sum of Squares | Df | Mean Square | F |
|---|---|---|---|---|
| Between Groups | 8157.579 | 3 | 2719.193 | 3.192* |
| Within Groups | 259856.700 | 305 | 851.989 |  |
| Total | 268014.278 | 308 |  |  |

* p < .05 Level

## *Experience vs IFTK Adoption*

Four groups were constituted for *Experience* demographic moderating variable namely less than 1 year, 1 to 5 years, 6 to 10 years, and more than 10 years. The ANOVA results in Table 52 indicate that there was significant difference between the groups. The table also shows that the f-value for the two groups is 18.693 and the $p < .01$ level. This result indicates that there is significant difference between the groups. It is indicative of the fact that when it comes to use of technology in the work, experience in the police service and with using technology is an important factor.

*Table 52 ANOVA Education level vs IFTK Adoption*

|  | Sum of Squares | Df | Mean Square | F |
|---|---|---|---|---|
| Between Groups | 41625.874 | 3 | 13875.291 | 18.693** |
| Within Groups | 226388.404 | 305 | 742.257 | |
| Total | 268014.278 | 308 | | |

** $p < .01$ Level

## *Frequency of Use of IFTK vs IFTK Adoption*

Four groups were constituted for *Frequency of Use of Toolkit* demographic moderating variable namely Never, Sometimes, Often and Always. The ANOVA results in Table 53 indicate that there was significant difference between the groups. The table also shows that the f-value for the groups is 23.92 and the $p < .01$ level. This result indicates that there is significant difference between the groups. It indicates that when it comes to use of technology in the work, experience in the police service and with using technology is an important factor.

*Table 53 ANOVA Frequency of Use of IFTK vs IFTK Adoption*

|  | Sum of Squares | Df | Mean Square | F |
|---|---|---|---|---|
| Between Groups | 51050.154 | 3 | 17016.718 | 23.921** |
| Within Groups | 216964.124 | 305 | 711.358 | |
| Total | 268014.278 | 308 | | |

** $p < .01$ Level

## *Number of Times IFTK Used vs IFTK Adoption*

Four groups were constituted for *Experience* demographic moderating variable namely More than 10 Times, More than 20 Times, More than 30 Times and More than 40 Times. The ANOVA results in Table 54 indicate that there is a significant difference between the groups. The table also shows that the f-value for the two groups is 3.027 and the $p < .05$ level. This result indicates that there is significant difference between the groups. It indicates that when it comes to use of toolkit at workplace, experience with using the toolkit is an important factor influencing toolkit adoption.

*Table 54 ANOVA Frequency of Use of IFTK vs IFTK Adoption*

|  | Sum of Squares | Df | Mean Square | F |
|---|---|---|---|---|
| Between Groups | 7748.075 | 3 | 2582.692 | 3.027* |
| Within Groups | 260266.203 | 305 | 853.332 |  |
| Total | 268014.278 | 308 |  |  |

\* $p < .05$ Level

## 4.2.5 Dimension wise group differences for each demographic variable

## *Gender vs IFTK Determiners*

Gender is an important construct to understanding the IFTK acceptance behaviour of users. For a long time, the Police force has always been a male-dominated workforce. However, recent decades have seen women joining and playing an important role in the police workforce. Also, historically, women's access to IFTK artifacts has been constrained due to various reasons. The Table 55 shows that gender moderates the following determiners of IFTK acceptance: Work Efficiency.

The results shows that there is a significant difference ($t=2.067$, $p < .05$ level) between male and female police personnel who adopt IFTK such that female police personnel (Female : (M- 15.27, SD-2.87)) who believe that the use of IFTK will lead to work efficiency are more likely to use IFTK than their male counterparts (Male : (M- 14.47, SD-3.64)).

However, the results also indicate that the group differences between male and female police personnel with respect to the role of Facilitating Conditions, Self-Efficacy, Social Influence, Performance expectancy, Effort expectancy, Facilitating conditions, and Anxiety are not significant, implying that these dimensions do not play an important role for police personnel to engage and adopt IFTK.

*Table 55  Independent Samples t-test: Gender vs IFTK Determiners*

|  | GEN | N | Mean | Std. Deviation | t-Value |
|---|---|---|---|---|---|
| IFTK_PE_T | Male | 183 | 17.8579 | 3.32680 | .066 |
|  | Female | 126 | 17.8333 | 3.04828 |  |
| IFTK_EE_T | Male | 183 | 14.3224 | 6.25817 | .988 |
|  | Female | 126 | 14.9206 | 3.19651 |  |
| IFTK_SI_T | Male | 183 | 18.5792 | 3.91994 | .337 |
|  | Female | 126 | 18.7222 | 3.24873 |  |
| IFTK_FC_T | Male | 183 | 14.1311 | 4.97071 | .274 |
|  | Female | 126 | 14.2857 | 4.74950 |  |
| IFTK_SE_T | Male | 183 | 13.9290 | 3.58114 | 1.752 |
|  | Female | 126 | 14.7143 | 4.26119 |  |
| IFTK_JS_T | Male | 183 | 14.3716 | 3.52755 | 1.882 |
|  | Female | 126 | 15.0873 | 2.89557 |  |
| IFTK_WE_T | Male | 183 | 14.4754 | 3.64770 | 2.067* |
|  | Female | 126 | 15.2778 | 2.87232 |  |
| IFTK_AX_T | Male | 183 | 13.5246 | 3.76919 | 1.066 |
|  | Female | 126 | 13.9762 | 3.49735 |  |
| IFTK_BI_T | Male | 183 | 15.2514 | 5.12398 | .831 |
|  | Female | 126 | 15.6667 | 2.73934 |  |
| IFTK_US_T | Male | 183 | 14.4973 | 4.46214 | 1.724 |
|  | Female | 126 | 15.2778 | 2.92476 |  |

\* p < .05 Level

## *VM Mode vs IFTK Determiners*

The criterion of engaging and using the IFTK in voluntary mode and mandatory mode is an important consideration to investigate in this research. The use of IFTK in voluntary mode is more self-driven and outcome oriented while in mandatory mode the use of IFTK is forced upon.

The results shown in Table 56 indicate that there is a significant difference (t=2.443, p < .05) between voluntary and mandatory police personnel users who adopt IFTK such that voluntary police personnel users (Voluntary: (M- 15.02, SD-3.24)) who believe that using IFTK will

positively lead to job satisfaction are more likely to use IFTK than their mandatory counterparts (Mandatory: (M- 14.08, SD-3.31)).

The results indicate that there is a significant difference (t=3.380, p < .01) between voluntary and mandatory police personnel users who adopt IFTK such that voluntary police personnel users (Voluntary: (M- 15.30, SD-3.22)) who believe that using IFTK will positively lead to work efficiency more likely to use IFTK than their mandatory counterparts (Mandatory: (M- 13.99, SD-3.45)).

The results indicate that there is a significant difference (t=4.434, p < .01) between voluntary and mandatory police personnel users who adopt IFTK such that voluntary police personnel users (Voluntary: (M- 14.41, SD-3.53)) who believe that being anxious is normal while using IFTK and it is important to get familiar with it over time are more likely to use IFTK than their mandatory counterparts (Mandatory: (M- 12.56, SD-3.58)).

The results indicate that there is a significant difference (t=3.820, p < .01 ) between voluntary and mandatory police personnel users who adopt IFTK such that voluntary police personnel users (Voluntary: (M- 15.47, SD-3.73)) are more likely to use IFTK than their mandatory counterparts (Mandatory: (M- 13.75, SD-4.00)).

However, the results also indicate that the group differences between Voluntary and Mandatory police personnel users with respect to the role of Facilitating Conditions, Self-Efficacy, Social Influence, Performance expectancy, Effort expectancy, and Facilitating conditions are not significant, implying that these dimensions do not play an important role for police personnel to engage and adopt IFTK.

*Table 56 Independent Samples t-test: Mode of Use vs IFTK Determiners*

|  | VMT | N | Mean | Std. Deviation | T |
|---|---|---|---|---|---|
| IFTK_PE_T | Voluntary | 191 | 17.7120 | 3.09937 | .946 |
|  | Mandatory | 118 | 18.0678 | 3.38607 |  |
| IFTK_EE_T | Voluntary | 191 | 14.9948 | 6.23023 | 1.838 |
|  | Mandatory | 118 | 13.8729 | 2.87205 |  |
| IFTK_SI_T | Voluntary | 191 | 18.7120 | 3.81766 | .455 |
|  | Mandatory | 118 | 18.5169 | 3.39112 |  |
| IFTK_FC_T | Voluntary | 191 | 14.4869 | 4.53392 | 1.345 |
|  | Mandatory | 118 | 13.7203 | 5.36670 |  |
| IFTK_SE_T | Voluntary | 191 | 14.4136 | 3.56468 | .946 |
|  | Mandatory | 118 | 13.9831 | 4.35789 |  |
| IFTK_JS_T | Voluntary | 191 | 15.0209 | 3.24274 | 2.443* |
|  | Mandatory | 118 | 14.0847 | 3.31940 |  |
| IFTK_WE_T | Voluntary | 191 | 15.3037 | 3.22685 | 3.380** |
|  | Mandatory | 118 | 13.9915 | 3.45544 |  |
| IFTK_AX_T | Voluntary | 191 | 14.4136 | 3.53801 | 4.434** |
|  | Mandatory | 118 | 12.5678 | 3.58410 |  |
| IFTK_BI_T | Voluntary | 191 | 15.7539 | 4.90297 | 1.733 |
|  | Mandatory | 118 | 14.8814 | 3.07504 |  |
| IFTK_US_T | Voluntary | 191 | 15.4712 | 3.73010 | 3.820** |
|  | Mandatory | 118 | 13.7542 | 4.00840 |  |

* $p < .05$ Level, ** $p < .01$ Level

## *Rank vs Dimensions*

The hierarchy of an organization plays an important role not only in creating role models for employees but also in inspiration and motivation to follow successful achievers. Moreover, employees tend to be influenced by those surrounding them in their immediate personal and professional networks. There are two rank groups used for this study, Officers and Constabulary.

The results shown in Table 57 indicate that there is a significant difference (t=2.935, $p <$ .01) between Officer and Constabulary police personnel users who adopt IFTK such that Officer police personnel users (Officer: (M- 15.22, SD-3.04)) who believe in their abilities to use IFTK are more likely to use IFTK than their Constabulary counterparts (Constabulary: (M- 13.82, SD-4.13)).

The results indicate that there is a significant difference (t=3.016, p < . 01) between Officer and Constabulary police personnel users who adopt IFTK such that Officer police personnel users (Officer: (M- 15.82, SD- 3.04)) are more likely to use IFTK than their Constabulary counterparts (Constabulary: (M- 14.37, SD-4.17)).

The results indicate that there is a significant difference (t=2.763, p < . 01) between Officer and Constabulary police personnel users who adopt IFTK such that Officer police personnel users (Officer: (M- 15.80, SD-3.93)) who perceive that it is easy to use IFTK and that it will take less effort are more likely to use IFTK than their Constabulary counterparts (Constabulary: (M- 14.03, SD-5.87)).

The results indicate that there is a significant difference (t=2.662, p < . 01) between Officer and Constabulary police personnel users who adopt IFTK such that Officer police personnel users (Officer: (M- 19.47, SD-3.02)) who are positively influenced by their peer and social group to use IFTK are more likely to use IFTK than their Constabulary counterparts (Constabulary: (M- 18.27, SD-3.84)).

The results indicate that there is a significant difference (t=4.139, p < . 01) between Officer and Constabulary police personnel users who adopt IFTK such that Officer police personnel users (Officer: (M- 15.81, SD-2.91)) who believe that using IFTK will positively lead to job satisfaction are more likely to use IFTK than their Constabulary counterparts (Constabulary: (M- 14.16, SD-3.33)).

The results indicate that there is a significant difference (t=3.770, p < . 01) between Officer and Constabulary police personnel users who adopt IFTK such that Officer police personnel users

(Officer: (M- 15.88, SD-2.76)) who believe that using IFTK will positively lead to work efficiency more likely to use IFTK than their Constabulary counterparts (Constabulary: (M- 14.33, SD-3.50)).

The results indicate that there is a significant difference (t=3.023, p < . 01) between Officer and Constabulary police personnel users who adopt IFTK such that Officer police personnel users (Officer: (M- 14.65, SD-3.34)) who believe that being anxious is normal while using IFTK and it is important to get familiar with it over time are more likely to use IFTK than their Constabulary counterparts (Constabulary: (M- 13.30, SD-3.72)).

The results indicate that there is a significant difference (t=2.898, p < . 01) between Officer and Constabulary police personnel users who adopt IFTK such that Officer police personnel users (Officer: (M- 18.64, SD-2.77)) who believe that engaging with technology will improve their performance are more likely to use IFTK than their Constabulary counterparts (Constabulary: (M- 17.50, SD-3.32)).

However, the results also indicate that the group differences between Officers and Constabulary police personnel with respect to the role of Facilitating Conditions and Behavioural Intention are not significant, implying that these dimensions do not play an important role for police personnel to engage and adopt IFTK.

*Table 57 Independent Samples t-test: Rank vs IFTK Determiners*

|  | PPC | N | Mean | Std. Deviation | T |
|---|---|---|---|---|---|
| IFTK_PE_T | Officers | 93 | 18.6452 | 2.77663 | 2.898** |
|  | Constabulary | 216 | 17.5046 | 3.32852 |  |
| IFTK_EE_T | Officers | 93 | 15.8065 | 2.93871 | 2.763** |
|  | Constabulary | 216 | 14.0324 | 5.87971 |  |
| IFTK_SI_T | Officers | 93 | 19.4731 | 3.02738 | 2.662** |
|  | Constabulary | 216 | 18.2778 | 3.84667 |  |
| IFTK_FC_T | Officers | 93 | 14.6022 | 4.16544 | .965 |

| | PPC | N | Mean | Std. Deviation | T |
|---|---|---|---|---|---|
| | Constabulary | 216 | 14.0185 | 5.14891 | |
| IFTK_SE_T | Officers | 93 | 15.2258 | 3.04006 | 2.935** |
| | Constabulary | 216 | 13.8287 | 4.13306 | |
| IFTK_JS_T | Officers | 93 | 15.8172 | 2.91900 | 4.139** |
| | Constabulary | 216 | 14.1667 | 3.33411 | |
| IFTK_WE_T | Officers | 93 | 15.8817 | 2.76566 | 3.770** |
| | Constabulary | 216 | 14.3380 | 3.50570 | |
| IFTK_AX_T | Officers | 93 | 14.6559 | 3.34435 | 3.023** |
| | Constabulary | 216 | 13.3009 | 3.72386 | |
| IFTK_BI_T | Officers | 93 | 16.0108 | 2.82648 | 1.582 |
| | Constabulary | 216 | 15.1667 | 4.79729 | |
| IFTK_US_T | Officers | 93 | 15.8280 | 3.04896 | 3.016** |
| | Constabulary | 216 | 14.3796 | 4.17460 | |

** $p < .01$ Level

## *Place of Work vs IFTK Determiners*

Place of Work (PoW) is an important factor for any human resource. There are several aspects connected to the place of work, such as access to a place of work, infrastructure, the comfort of work, distance from home and residence, distance from the main office, etc. There are two groups in this study related to place of work, namely, Urban and Rural.

The results in Table 58 indicate that there is a significant difference (t=3.246, p < .01) between Urban and Rural police personnel users who adopt IFTK such that Urban police personnel users (Urban: (M- 19.81, SD-3.38)) who are positively influenced by their peers and other people in their social network are more likely to use IFTK than their Rural counterparts (Rural: (M- 18.13, SD-)).

The results indicate that there is a significant difference (t=3.065, p < .01) between Urban and Rural police personnel users who adopt IFTK such that Urban police personnel users (Urban: (M- 15.56, SD-2.94)) who believe that using IFTK will positively lead to work efficiency more likely to use IFTK than their Rural counterparts (Rural: (M- 14.36, SD-3.52)).

The results indicate that there is a significant difference (t=2.677, p < .01) between Urban and Rural police personnel users who adopt IFTK such that Urban police personnel users (Urban: (M- 15.31, SD-3.25)) who believe that using IFTK will positively lead to job satisfaction more likely to use IFTK than their Rural counterparts (Rural: (M- 14.28, SD-3.27)).

The results indicate that there is a significant difference (t=3.786, p < .01) between Urban and Rural police personnel users who adopt IFTK such that Urban police personnel users (Urban: (M- 14.72, SD-3.43)) who believe that being anxious is normal while using IFTK and it is important to get familiar with it over time are more likely to use IFTK than their Rural counterparts (Rural: (M- 13.12, SD-3.66)).

The results indicate that there is a significant difference (t=4.724, p < .01) between Urban and Rural police personnel users who adopt IFTK such that Urban police personnel users (Urban: (M- 18.94, SD-3.10)) who believe that engaging with technology will improve their performance are more likely to use IFTK than their Rural counterparts (Rural: (M- 17.21, SD-3.11)).

However, there are no significant group differences for the determiners: Facilitating conditions, Effort expectancy, Self-Efficacy, Behavioural Intention, and Usage Behaviour. It implies that Facilitating conditions, Effort expectancy, Self-Efficacy, Behavioural Intention and Usage Behaviour doesn't play an important role in the geographic setting of the police workforce to adopt IFTK.

*Table 58 Independent Samples t-test: Place of Work vs IFTK Determiners*

|  | POW | N | Mean | Std. Deviation | T |
|---|---|---|---|---|---|
| IFTK_PE_T | Urban | 196 | 18.9469 | 3.10252 | 4.724** |
|  | Rural | 113 | 17.2143 | 3.11058 |  |
| IFTK_EE_T | Urban | 196 | 14.3673 | 6.05003 | .880 |

|  | POW | N | Mean | Std. Deviation | T |
|---|---|---|---|---|---|
|  | Rural | 113 | 14.9115 | 3.37151 |  |
| IFTK_SI_T | Urban | 196 | 19.5133 | 3.38620 | 3.246** |
|  | Rural | 113 | 18.1327 | 3.71866 |  |
| IFTK_FC_T | Urban | 196 | 13.9745 | 5.27834 | 1.044 |
|  | Rural | 113 | 14.5752 | 4.07476 |  |
| IFTK_SE_T | Urban | 196 | 14.0102 | 4.06106 | 1.426 |
|  | Rural | 113 | 14.6637 | 3.53960 |  |
| IFTK_JS_T | Urban | 196 | 15.3186 | 3.25970 | 2.677** |
|  | Rural | 113 | 14.2857 | 3.27672 |  |
| IFTK_WE_T | Urban | 196 | 15.5664 | 2.94557 | 3.065** |
|  | Rural | 113 | 14.3622 | 3.52666 |  |
| IFTK_AX_T | Urban | 196 | 14.7257 | 3.43368 | 3.786** |
|  | Rural | 113 | 13.1224 | 3.66904 |  |
| IFTK_BI_T | Urban | 196 | 15.0714 | 4.85006 | 1.883 |
|  | Rural | 113 | 16.0265 | 3.10086 |  |
| IFTK_US_T | Urban | 196 | 14.5918 | 4.02259 | 1.322 |
|  | Rural | 113 | 15.2035 | 3.72769 |  |

** p < .01 Level

## *Availability of IFTK vs IFTK Determiners*

The availability of resources is an important factor to be considered when measuring its adoption. For the purpose of this research, availability was assessed based on whether the forensic toolkit is available at the workstation or not.

The results in Table 59 indicate that there is a significant difference (t=2.690, p < .01) between Available and Not Available police personnel users who encountered adequate facilitating conditions for the use of IFTK such that Available police personnel (Available: (M- 14.62, SD-3.50)) are more likely to use IFTK than their Not Available counterparts (Not Available: (M-12.92, SD-5.19)).

The results indicate that there is a significant difference (t=2.146, p < .05) between Available and Not Available police personnel users who adopt IFTK such that Available police personnel users (Available: (M- 14.89, SD-3.23)) who believe that using IFTK will positively lead to job satisfaction are more likely to use IFTK than their Not Available counterparts (Not Available: (M- 13.97, SD-3.41)).

116

However, there are no significant group differences for the determiners: Effort Expectancy, Performance Expectancy, Social Influence, Anxiety, Self-Efficacy, Behavioural Intention, and Usage Behaviour. It implies that Effort Expectancy, Performance Expectancy, Social Influence, Anxiety, Self-Efficacy, Behavioural Intention, and Usage Behaviour don't play an essential role in the geographic setting of the police workforce to adopt IFTK.

*Table 59 Independent Samples t-test: Availability of IFTK vs IFTK Determiners*

|  | AOT | N | Mean | Std. Deviation | t-Value |
|---|---|---|---|---|---|
| IFTK_PE_T | YES | 231 | 17.9610 | 3.11284 | 1.066 |
|  | NO | 78 | 17.5128 | 3.48557 |  |
| IFTK_EE_T | YES | 231 | 14.7965 | 5.65587 | 1.333 |
|  | NO | 78 | 13.8846 | 3.65023 |  |
| IFTK_SI_T | YES | 231 | 18.8485 | 3.85481 | 1.751 |
|  | NO | 78 | 18.0128 | 2.92545 |  |
| IFTK_FC_T | YES | 231 | 14.6234 | 3.50795 | 2.690** |
|  | NO | 78 | 12.9231 | 5.19290 |  |
| IFTK_SE_T | YES | 231 | 14.1905 | 3.60894 | -.457 |
|  | NO | 78 | 14.4231 | 4.63056 |  |
| IFTK_JS_T | YES | 231 | 14.8961 | 3.23265 | 2.146* |
|  | NO | 78 | 13.9744 | 3.41492 |  |
| IFTK_WE_T | YES | 231 | 14.9827 | 3.41348 | 1.620 |
|  | NO | 78 | 14.2692 | 3.20581 |  |
| IFTK_AX_T | YES | 231 | 13.8788 | 3.65621 | 1.407 |
|  | NO | 78 | 13.2051 | 3.65513 |  |
| IFTK_BI_T | YES | 231 | 15.6320 | 4.67357 | 1.485 |
|  | NO | 78 | 14.7949 | 2.93815 |  |
| IFTK_US_T | YES | 231 | 14.8398 | 3.60017 | .187 |
|  | NO | 78 | 14.7436 | 4.77666 |  |

* p < .05 Level, ** p < .01 Level

## *IFTK Training vs IFTK Determiners*

Pre-service and in-service training play an important role in the career development of an employee. Training on essential job functions is an essential part of human resource development in an organization. For the purpose of this study, the training acquisition to use IFTK and how it influences the demographics has been measured by assessing whether the police personnel have undergone specific training or not.

The results in Table 60 indicate that there is a significant difference (t=3.502, p < .01) between Trained and Not Trained police personnel users who encountered adequate facilitating conditions for the use of IFTK such that Trained police personnel (Trained: (M-15.26, SD-4.53)) are more likely to use IFTK than their Not Trained counterparts (Not Trained: (M- 13.34, SD-4.97)).

The results indicate that there is a significant difference (t=4.330, p < .01) between Trained and Not Trained police personnel users who adopt IFTK such that Trained police personnel users (Trained: (M- 15.29, SD-4.07)) who believe in their abilities to use IFTK are more likely to use IFTK than their Not Trained counterparts (Not Trained: (M- 13.41, SD-3.52)).

The results indicate that there is a significant difference (t=3.331, p < .01) between Trained and Not Trained police personnel users who adopt IFTK such that Trained police personnel users (Trained: (M- 15.63, SD-3.00)) are more likely to use IFTK than their Not Trained counterparts (Not Trained: (M- 14.16, SD-4.42)).

The results indicate that there is a significant difference (t=3.364, p < .01) between Trained and Not Trained police personnel users who adopt IFTK such that Trained police personnel users (Trained: (M- 19.40, SD-3.53)) who are positively influenced by their peer and social group to use IFTK are more likely to use IFTK than their Not Trained counterparts (Not Trained: (M- 18.02, SD-3.64)).

The results indicate that there is a significant difference (t=4.022, p < .01) between Trained and Not Trained police personnel users who adopt IFTK such that Trained police personnel users (Trained: (M- 15.48, SD-3.31)) who believe that using IFTK will positively lead to job satisfaction

are more likely to use IFTK than their Not Trained counterparts (Not Trained: (M- 14.00, SD-3.13)).

The results indicate that there is a significant difference (t=4.148, p < .01) between Trained and Not Trained police personnel users who adopt IFTK such that Trained police personnel users (Trained: (M- 15.67, SD-3.12)) who believe that using IFTK will positively lead to work efficiency more likely to use IFTK than their Not Trained counterparts (Not Trained: (M- 14.11, SD-3.40)).

The results indicate that there is a significant difference (t=3.525, p < .01) between Trained and Not Trained police personnel users who adopt IFTK such that Trained police personnel users (Trained: (M- 16.37, SD-5.45)) who believe that a positive intention to use IFTK will lead to higher IFTK engagement at work are more likely to use IFTK than their Not Trained counterparts (Not Trained: (M- 14.66, SD-2.91)).

The results indicate that there is a significant difference (t=2.488, p < .05) between Trained and Not Trained police personnel users who adopt IFTK such that Trained police personnel users (Trained: (M- 14.28, SD-3.45)) who believe that being anxious is normal while using IFTK and it is important to get familiar with it over time are more likely to use IFTK than their Not Trained counterparts (Not Trained: (M- 13.25, SD-3.76)).

The results indicate that there is a significant difference (t=2.402, p < .05) between Trained and Not Trained police personnel users who adopt IFTK such that Trained police personnel users (Trained: (M- 18.33, SD-3.19)) who believe that engaging with technology will improve their performance are more likely to use IFTK than their Not Trained counterparts (Not Trained: (M-17.45, SD-3.17)).

However, there are no significant group differences for the determiners: Effort Expectancy. It implies that Effort Expectancy don't play an essential role in the training status of the police workforce to adopt IFTK.

*Table 60 Independent Samples t-test: IFTK Training vs IFTK Determiners*

| | TRN | N | Mean | Std. Deviation | T |
|---|---|---|---|---|---|
| IFTK_PE_T | YES | 137 | 18.3358 | 3.19990 | 2.402* |
| | NO | 172 | 17.4593 | 3.17585 | |
| IFTK_EE_T | YES | 137 | 15.1898 | 3.17974 | 1.877 |
| | NO | 172 | 14.0698 | 6.38033 | |
| IFTK_SI_T | YES | 137 | 19.4088 | 3.53461 | 3.364** |
| | NO | 172 | 18.0233 | 3.64500 | |
| IFTK_FC_T | YES | 137 | 15.2628 | 4.53786 | 3.502** |
| | NO | 172 | 13.3430 | 4.97759 | |
| IFTK_SE_T | YES | 137 | 15.2920 | 4.07135 | 4.330** |
| | NO | 172 | 13.4186 | 3.52755 | |
| IFTK_JS_T | YES | 137 | 15.4891 | 3.31910 | 4.022** |
| | NO | 172 | 14.0058 | 3.13907 | |
| IFTK_WE_T | YES | 137 | 15.6715 | 3.12746 | 4.148** |
| | NO | 172 | 14.1105 | 3.40699 | |
| IFTK_AX_T | YES | 137 | 14.2847 | 3.45123 | 2.488* |
| | NO | 172 | 13.2500 | 3.76833 | |
| IFTK_BI_T | YES | 137 | 16.3723 | 5.45706 | 3.525** |
| | NO | 172 | 14.6628 | 2.91842 | |
| IFTK_US_T | YES | 137 | 15.6350 | 3.00215 | 3.331** |
| | NO | 172 | 14.1628 | 4.42444 | |

\* p < .05 Level, \*\* p < .01 Level

## *IFTK Usefulness vs IFTK Determinants*

The perceived usefulness of an artifact of use is an important factor in the process of adoption of that artifact for actual use. For the purpose of this study, the usefulness of IFTK and how it influences the dimensions has been measured by assessing whether the police personnel perceive IFTK to be useful or not.

The results in Table 61 indicate that there is a significant difference (t=2.580, p < .05) between police personnel users who adopt IFTK such that police personnel who believe that IFTK

is useful (Useful: (M- 15.30, SD-3.71)) are more likely to use IFTK than their counterparts who believe that it is not useful (Not Useful: (M- 14.14, SD-4.00)).

The results indicate that there is a significant difference (t=2.366, p < .05) between police personnel users who adopt IFTK such that police personnel who believe that IFTK is useful (Useful: (M- 15.306, SD-3.00)) who perceive that it is easy to use IFTK and that it will take less effort are more likely to use IFTK than their counterparts who believe that it is not useful (Not Useful: (M- 13.74, SD-3.34)).

The results indicate that there is a significant difference (t=2.087, p < .05) between police personnel users who adopt IFTK such that police personnel who believe that IFTK is useful (Useful: (M- 15.85, SD-3.31)) who believe that a positive intention to use IFTK will lead to higher IFTK engagement at work are more likely to use IFTK than their counterparts who believe that it is not useful (Not Useful: (M- 14.82, SD-4.87)).

The results indicate that there is a significant difference (t=2.642, p < .01) between police personnel users who adopt IFTK such that police personnel who believe that IFTK is useful (Useful: (M- 14.17, SD-3.89)) who believe that being anxious is normal while using IFTK and it is important to get familiar with it over time are more likely to use IFTK than their counterparts who believe that it is not useful (Not Useful: (M- 13.06, SD-3.22)).

However, there are no significant group differences for the determiners: Performance Expectancy, Social Influence, Self-Efficacy, Behavioural Intention, Facilitating Conditions, Work Efficiency, and Job Satisfaction. It implies Performance Expectancy, Social Influence, Self-Efficacy, Behavioural Intention, Facilitating Conditions, Work Efficiency, and Job Satisfaction.

don't play an essential role in the perceived usefulness of IFTK in the police workforce for adoption of the toolkit.

*Table 61 Independent Samples t-test: IFTK Usefulness vs IFTK Determiners*

| | USE | N | Mean | Std. Deviation | T |
|---|---|---|---|---|---|
| IFTK_PE_T | NO | 130 | 17.6538 | 3.23429 | .905 |
| | YES | 179 | 17.9888 | 3.19583 | |
| IFTK_EE_T | NO | 130 | 13.7462 | 3.34313 | 2.366* |
| | YES | 179 | 15.1620 | 3.00957 | |
| IFTK_SI_T | NO | 130 | 18.1846 | 3.88554 | 1.863 |
| | YES | 179 | 18.9665 | 3.45419 | |
| IFTK_FC_T | NO | 130 | 14.2692 | 5.23966 | .230 |
| | YES | 179 | 14.1397 | 4.60551 | |
| IFTK_SE_T | NO | 130 | 13.9077 | 3.06125 | 1.318 |
| | YES | 179 | 14.4972 | 4.37995 | |
| IFTK_JS_T | NO | 130 | 14.3231 | 3.31362 | 1.549 |
| | YES | 179 | 14.9106 | 3.27449 | |
| IFTK_WE_T | NO | 130 | 14.4154 | 3.21765 | 1.726 |
| | YES | 179 | 15.0838 | 3.46065 | |
| IFTK_AX_T | NO | 130 | 14.1732 | 3.89441 | 2.642** |
| | YES | 179 | 13.0692 | 3.22103 | |
| IFTK_BI_T | NO | 130 | 14.8231 | 4.87727 | 2.087* |
| | YES | 179 | 15.8547 | 3.31187 | |
| IFTK_US_T | NO | 130 | 14.1462 | 4.00681 | 2.580* |
| | YES | 179 | 15.3017 | 3.71486 | |

\* p < .05 Level, \*\* p < .01 Level

## *IFTK Significance vs IFTK Determiners*

The perceived significance of an artifact of use is an important factor in the process of adoption of that artifact for actual use. For the purpose of this study, the significance of IFTK and how it is affected by the determiners of adoption has been measured by assessing whether the police personnel perceive IFTK to be significant in their work or not.

The results in Table 62 indicate that there is a significant difference (t=2.473, p < .05) between police personnel who believe that IFTK is Significant (Significant: (M- 15.23, SD-3.37)) such that police personnel who perceive that it is easy to use IFTK and that it will take less effort

are more likely to use IFTK than their counterparts who believe that it is not Significant (Not Significant: (M- 13.77, SD-4.28)).

The results indicate that there is a significant difference (t=2.2.48, p < .05) between police personnel who believe that IFTK is Significant (Significant: (M- 19.06, SD-3.33)) such that police personnel who perceive they are influenced by their peers and social network are more likely to use IFTK than their counterparts who believe that it is not Significant (Not Significant: (M- 18.13, SD-3.95)).

The results indicate that there is a significant difference (t=2.068, p < .05) between police personnel who believe that IFTK is Significant (Significant: (M- 15.88, SD-2.20)) who believe that a positive intention to use IFTK will lead to higher IFTK engagement at work are more likely to use IFTK than their counterparts who believe that it is not Significant (Not Significant: (M- 14.87, SD-2.85)).

The results indicate that there is a significant difference (t=2.344, p < .05) between police personnel who believe that IFTK is Significant (Significant: (M- 14.15, SD-3.68)) who believe that being anxious is normal while using IFTK and it is important to get familiar with it over time are more likely to use IFTK than their counterparts who believe that it is not Significant (Not Significant: (M- 13.18, SD-3.58)).

However, there are no significant group differences for the determiners: Performance Expectancy, Self-Efficacy, Facilitating Conditions, Work Efficiency, Usage Behaviour and Job Satisfaction. It implies that performance Expectancy, Self-Efficacy, Facilitating Conditions, Work

Efficiency, Usage Behaviour, and Job Satisfaction don't play an essential role in the perceived significance of IFTK in the police workforce for the adoption of the toolkit.

*Table 62 Independent Samples t-test: IFTK Usefulness vs IFTK Determiners*

|  | SIG | N | Mean | Std. Deviation | T |
|---|---|---|---|---|---|
| IFTK_PE_T | NO | 142 | 17.4648 | 3.47363 | 1.943 |
|  | YES | 167 | 18.1737 | 2.94115 |  |
| IFTK_EE_T | NO | 142 | 13.7746 | 4.28632 | 2.473* |
|  | YES | 167 | 15.2395 | 3.37409 |  |
| IFTK_SI_T | NO | 142 | 18.1338 | 3.95404 | 2.248* |
|  | YES | 167 | 19.0659 | 3.33499 |  |
| IFTK_FC_T | NO | 142 | 14.2746 | 5.15042 | .267 |
|  | YES | 167 | 14.1257 | 4.64159 |  |
| IFTK_SE_T | NO | 142 | 13.8451 | 3.25140 | 1.691 |
|  | YES | 167 | 14.5928 | 4.33278 |  |
| IFTK_JS_T | NO | 142 | 14.4930 | 3.18629 | .837 |
|  | YES | 167 | 14.8084 | 3.39371 |  |
| IFTK_WE_T | NO | 142 | 14.6338 | 3.07236 | .811 |
|  | YES | 167 | 14.9461 | 3.60932 |  |
| IFTK_AX_T | NO | 142 | 13.1831 | 3.58013 | 2.344* |
|  | YES | 167 | 14.1557 | 3.68157 |  |
| IFTK_BI_T | NO | 142 | 14.8732 | 2.85801 | 2.068* |
|  | YES | 167 | 15.8862 | 2.20590 |  |
| IFTK_US_T | NO | 142 | 14.5000 | 4.11320 | 1.305 |
|  | YES | 167 | 15.0838 | 3.74393 |  |

\* $p < .05$ Level, \*\* $p < .01$

## *Experience vs IFTK Adoption Determinants*

Experience is an important factor when considered in the workplace. Employees with longer work experience tend to carry out the task in a more nuanced manner. For the purpose of this research, four groups were used to see the effect of experience with respect to the dimensions. Results in Table 63 indicate that there were significant differences between groups with respect to all the determiners of behavioral intention to use IFTK.

Facilitating conditions were more important for police personnel with experience of 10 years and above as compared to those who had less experience. This can be attributed to the fact that younger generations' exposure to IFTK happens at an early stage, and they are more proficient

with IFTK artifacts. Similarly, police personnel with an experience bracket of 10 years and above give more significance to self-capabilities (SE), IFTK usage (US), Effort requirement for use of IFTK (EE), Influence of their social network (SI), Job Satisfaction (JS), Efficiency at work (WE), Intention to use IFTK (BI), Anxiety while using IFTK (AX) and improvement in performance when using IFTK (PE) as compared to police personnel with less experience.

*Table 63 ANOVA: Experience vs IFTK Determiners*

| | | Sum of Squares | Df | Mean Square | F |
|---|---|---|---|---|---|
| IFTK_PE_T | Between Groups | 178.222 | 3 | 59.407 | 6.045** |
| | Within Groups | 2997.629 | 305 | 9.828 | |
| IFTK_EE_T | Between Groups | 560.405 | 3 | 186.802 | 7.238** |
| | Within Groups | 7871.485 | 305 | 25.808 | |
| IFTK_SI_T | Between Groups | 308.226 | 3 | 102.742 | 8.227** |
| | Within Groups | 3809.179 | 305 | 12.489 | |
| IFTK_FC_T | Between Groups | 571.304 | 3 | 190.435 | 8.609** |
| | Within Groups | 6747.045 | 305 | 22.121 | |
| IFTK_SE_T | Between Groups | 350.996 | 3 | 116.999 | 8.301** |
| | Within Groups | 4298.816 | 305 | 14.094 | |
| IFTK_JS_T | Between Groups | 421.873 | 3 | 140.624 | 14.643** |
| | Within Groups | 2929.124 | 305 | 9.604 | |
| IFTK_WE_T | Between Groups | 532.598 | 3 | 177.533 | 18.242** |
| | Within Groups | 2968.360 | 305 | 9.732 | |
| IFTK_AX_T | Between Groups | 498.387 | 3 | 166.129 | 13.953** |
| | Within Groups | 3631.400 | 305 | 11.906 | |
| IFTK_BI_T | Between Groups | 189.225 | 3 | 63.075 | 3.472** |
| | Within Groups | 5540.082 | 305 | 18.164 | |
| IFTK_US_T | Between Groups | 737.446 | 3 | 245.815 | 18.739** |
| | Within Groups | 4001.039 | 305 | 13.118 | |

\* p < .01 Level

## *Age vs IFTK Adoption Determiners*

Age is an important factor when considered in the workplace. Employees with longer work Age tend to carry out the task in a more nuanced manner. For the purpose of this research, four groups were used to see the effect of Age with respect to the dimensions. Results in Table 64 indicate that there were significant differences between groups with respect to some of the determiners of the adoption of IFTK. Police personnel with an Age bracket of 40 years and above give more significance to Anxiety while using IFTK (AX) and self-capabilities (SE) to police

personnel of the age group 40 and below. However, for Facilitating Conditions (FC), Effort requirement for the use of IFTK (EE), Influence of their social network (SI), actual Usage (US), and improvement in performance when using IFTK (PE). Work Efficiency (WE) and Job Satisfaction (JS) determiners, there was no significant difference between these groups.

*Table 64 ANOVA: Age vs IFTK Determiners*

|  |  | Sum of Squares | Df | Mean Square | F |
|---|---|---|---|---|---|
| IFTK_PE_T | Between Groups | 50.691 | 3 | 16.897 | 1.649 |
|  | Within Groups | 3125.160 | 305 | 10.246 |  |
| IFTK_EE_T | Between Groups | 166.495 | 3 | 55.498 | 2.048 |
|  | Within Groups | 8265.395 | 305 | 27.100 |  |
| IFTK_SI_T | Between Groups | 68.056 | 3 | 22.685 | 1.709 |
|  | Within Groups | 4049.349 | 305 | 13.277 |  |
| IFTK_FC_T | Between Groups | 85.911 | 3 | 28.637 | 1.208 |
|  | Within Groups | 7232.439 | 305 | 23.713 |  |
| IFTK_SE_T | Between Groups | 135.230 | 3 | 45.077 | 3.045* |
|  | Within Groups | 4514.582 | 305 | 14.802 |  |
| IFTK_JS_T | Between Groups | 47.305 | 3 | 15.768 | 1.456 |
|  | Within Groups | 3303.692 | 305 | 10.832 |  |
| IFTK_WE_T | Between Groups | 41.818 | 3 | 13.939 | 1.229 |
|  | Within Groups | 3459.140 | 305 | 11.341 |  |
| IFTK_AX_T | Between Groups | 136.949 | 3 | 45.650 | 3.487* |
|  | Within Groups | 3992.837 | 305 | 13.091 |  |
| IFTK_BI_T | Between Groups | 117.411 | 3 | 39.137 | 2.127 |
|  | Within Groups | 5611.896 | 305 | 18.400 |  |
| IFTK_US_T | Between Groups | 75.517 | 3 | 25.172 | 1.647 |
|  | Within Groups | 4662.968 | 305 | 15.288 |  |

* $p < .05$ Level

## *Education vs IFTK Adoption Determinants*

Education is an important factor when considered in the workplace. Employees with higher educational qualifications are considered long-term and valuable assets for the organization. They are also suitable for specialized tasks as they possess specialized training as a result of their qualification. For the purpose of this research, four groups were used to see the effect of educational qualification with respect to the dimensions. Results in Table 65 indicate that there were significant differences between groups with respect to some of the determiners of the adoption of IFTK.

Police personnel with an educational qualification of graduate and above give more significance to Job Satisfaction (JS), Facilitating Conditions (FC), improvement in performance when using IFTK (PE), Anxiety while using IFTK (AX) and IFTK usage (US) as compared to police personnel of the age group 40 and below. However, for Efficiency at work (WE), self-capabilities (SE), Effort requirement for the use of IFTK (EE), Influence of their social network (SI) and Intention to use IFTK (BI) determiners, there was no significant difference between these groups. This can be attributed to the reason that irrespective of the educational qualification, Experience becomes more important here.

*Table 65 ANOVA: Education vs IFTK Determiners*

|  |  | Sum of Squares | Df | Mean Square | F |
|---|---|---|---|---|---|
| IFTK_PE_T | Between Groups | 104.115 | 3 | 34.705 | 3.446* |
|  | Within Groups | 3071.736 | 305 | 10.071 |  |
| IFTK_EE_T | Between Groups | 64.816 | 3 | 21.605 | .788 |
|  | Within Groups | 8367.074 | 305 | 27.433 |  |
| IFTK_SI_T | Between Groups | 25.598 | 3 | 8.533 | .636 |
|  | Within Groups | 4091.806 | 305 | 13.416 |  |
| IFTK_FC_T | Between Groups | 298.892 | 3 | 99.631 | 4.329** |
|  | Within Groups | 7019.458 | 305 | 23.015 |  |
| IFTK_SE_T | Between Groups | 55.599 | 3 | 18.533 | 1.230 |
|  | Within Groups | 4594.214 | 305 | 15.063 |  |
| IFTK_JS_T | Between Groups | 116.572 | 3 | 38.857 | 3.664* |
|  | Within Groups | 3234.425 | 305 | 10.605 |  |
| IFTK_WE_T | Between Groups | 76.537 | 3 | 25.512 | 2.272 |
|  | Within Groups | 3424.421 | 305 | 11.228 |  |
| IFTK_AX_T | Between Groups | 123.462 | 3 | 41.154 | 3.133* |
|  | Within Groups | 4006.324 | 305 | 13.135 |  |
| IFTK_BI_T | Between Groups | 76.478 | 3 | 25.493 | 1.375 |
|  | Within Groups | 5652.829 | 305 | 18.534 |  |
| IFTK_US_T | Between Groups | 134.225 | 3 | 44.742 | 2.964* |
|  | Within Groups | 4604.260 | 305 | 15.096 |  |

\* p < .05 Level, \*\* p < .01 Level

## *Number of Investigations Using IFTK vs IFTK Adoption Determinants*

Experience is an important factor when considered in the workplace. Employees with longer work experience tend to carry out the task in a more nuanced manner. Experience can be gathered by repeatedly engaging in an activity. For the purpose of this research, four groups were used to see the effect of the number of times a police person used the toolkit with respect to the

dimensions. Results in Table 66 indicate that there were significant differences between groups with respect to some of the determiners of the adoption of IFTK.

Police personnel who have used the IFTK more than 30 times in their career are tmore likely to be affected by the Job Satisfaction determiner and their intention to use IFTK will also be influenced positively in contrast to those police personnel who have used it less than 30 times in their career.

Other determiners including Facilitating conditions (FC), self-capabilities (SE), IFTK usage (US), Effort requirement for use of IFTK (EE), Influence of their social network (SI), Efficiency at work (WE), Anxiety while using IFTK (AX) and improvement in performance when using IFTK (PE) do not show any significant difference with respect to number of times police personnel has used the IFTK or not.

*Table 66 ANOVA: Number of Investigation Using IFTK vs IFTK Determiners*

|  |  | Sum of Squares | Df | Mean Square | F |
|---|---|---|---|---|---|
| IFTK_PE_T | Between Groups | 39.645 | 3 | 13.215 | 1.285 |
|  | Within Groups | 3136.206 | 305 | 10.283 |  |
| IFTK_EE_T | Between Groups | 120.173 | 3 | 40.058 | 1.470 |
|  | Within Groups | 8311.717 | 305 | 27.252 |  |
| IFTK_SI_T | Between Groups | 82.586 | 3 | 27.529 | 2.081 |
|  | Within Groups | 4034.818 | 305 | 13.229 |  |
| IFTK_FC_T | Between Groups | 19.993 | 3 | 6.664 | .279 |
|  | Within Groups | 7298.356 | 305 | 23.929 |  |
| IFTK_SE_T | Between Groups | 95.900 | 3 | 31.967 | 2.141 |
|  | Within Groups | 4553.912 | 305 | 14.931 |  |
| IFTK_JS_T | Between Groups | 108.207 | 3 | 36.069 | 3.392* |
|  | Within Groups | 3242.790 | 305 | 10.632 |  |
| IFTK_WE_T | Between Groups | 61.845 | 3 | 20.615 | 1.828 |
|  | Within Groups | 3439.113 | 305 | 11.276 |  |
| IFTK_AX_T | Between Groups | 61.706 | 3 | 20.569 | 1.542 |
|  | Within Groups | 4068.080 | 305 | 13.338 |  |
| IFTK_BI_T | Between Groups | 277.108 | 3 | 92.369 | 5.167* |
|  | Within Groups | 5452.199 | 305 | 17.876 |  |
| IFTK_US_T | Between Groups | 91.657 | 3 | 30.552 | 2.005 |
|  | Within Groups | 4646.829 | 305 | 15.236 |  |

## Frequency of Use of IFTK vs IFTK Adoption Determinants

Discipline at work is very important to achieve the desired output. For the best results, it is important that the standard operating procedure be followed, particularly in law enforcement. It is important to investigate the differences between groups who use IFTK to varying degrees of discipline in their work. For the purpose of this research, four groups were used to see the effect of the frequency of use of IFTK with respect to the dimensions. Results in Table 67  indicate that there were significant differences between groups with respect to all the determiners of the adoption of IFTK.

The results show that Police personnel who often use IFTK in their investigations consider self-capabilities (SE), IFTK usage (US), Effort requirement for use of IFTK (EE), Influence of their social network (SI), Job Satisfaction (JS), Efficiency at work (WE), Intention to use IFTK (BI), Anxiety while using IFTK (AX) and improvement in performance when using IFTK (PE) as important factors which facilitates IFTK adoption compared to police personnel use IFTK only sometimes or never use it.

*Table 67 ANOVA: Number of Investigation Using IFTK vs IFTK Determiners*

|  |  | Sum of Squares | Df | Mean Square | F |
|---|---|---|---|---|---|
| IFTK_PE_T | Between Groups | 173.526 | 3 | 57.842 | 5.876** |
|  | Within Groups | 3002.325 | 305 | 9.844 |  |
| IFTK_EE_T | Between Groups | 671.539 | 3 | 223.846 | 8.798** |
|  | Within Groups | 7760.351 | 305 | 25.444 |  |
| IFTK_SI_T | Between Groups | 329.707 | 3 | 109.902 | 8.850** |
|  | Within Groups | 3787.697 | 305 | 12.419 |  |
| IFTK_FC_T | Between Groups | 240.886 | 3 | 80.295 | 3.460** |
|  | Within Groups | 7077.464 | 305 | 23.205 |  |
| IFTK_SE_T | Between Groups | 217.165 | 3 | 72.388 | 4.981** |
|  | Within Groups | 4432.647 | 305 | 14.533 |  |
| IFTK_JS_T | Between Groups | 305.046 | 3 | 101.682 | 10.182** |
|  | Within Groups | 3045.951 | 305 | 9.987 |  |
| IFTK_WE_T | Between Groups | 337.426 | 3 | 112.475 | 10.844** |
|  | Within Groups | 3163.532 | 305 | 10.372 |  |
| IFTK_AX_T | Between Groups | 247.806 | 3 | 82.602 | 6.490** |
|  | Within Groups | 3881.980 | 305 | 12.728 |  |
| IFTK_BI_T | Between Groups | 66.800 | 3 | 22.267 | 1.199* |
|  | Within Groups | 5662.507 | 305 | 18.566 |  |
| IFTK_US_T | Between Groups | 507.418 | 3 | 169.139 | 12.193** |
|  | Within Groups | 4231.067 | 305 | 13.872 |  |

## 4.3 Summary

This chapter presented the results of the statistical analysis of the study. Quantitative method was use to collect primary data via Scale survey. The analysis includes use of parametric test namely- independents samples-t test for demographics having two group sand ANOVA for demographics which has more than two groups. Moreover, the analysis presented demographic differentiation at technology adoption behavior at meta level, i.e. at a cumulative score of independent variable and at micro level, i.e. at the individual determinant level. The analysis focused on presenting the difference, if any, between demographic groups among Police personnel with respect to ICT Adoption, and to record the significance of the difference; the difference, if any, between demographic groups among Police personnel with respect to IFTK Adoption, and to record the significance of the difference; difference, if any, between demographic groups and the Determinants of ICT Adoption among Police personnel and to record the significance of the difference and the difference, if any, between demographic groups and the Determinants of IFTK Adoption among Police personnel and to record the significance of the difference.

# Chapter 5

# 5.Discussion of Results

This chapter discusses results obtained through statistical analysis in the previous chapter. The chapter considers the concerned demographic variable and the obtained result pertaining to that demographic variable and then substantiates the finding based on the context of the study, existing research observations, and theoretical groundings. The discussion also embeds the qualitative inputs gathered via the interviews of police personnel and weaves into the narrative discourse into the findings from quantitative analysis.

## 5.1. Demographics, Results and Discussion

*VM and Technology Adoption:* The intended value addition via technology is also a function of intrinsic factors. Voluntariness of the engagement of technology (Information and Communication Technology) is an intrinsic motivator. Voluntariness has invariably been postulated as a moderator of the relationship between determinants and behavioral intention (Chen et al., 2015; Abbasi et al.,2011). The voluntary use of ICT can potentially integrate the technology at the workplace in policing. Additionally, research also indicates that the mandated use of technology incurs higher integration costs (Tsai et al., 2017). Since police personnel spend a lot of time in the field, the voluntary use of ICT is a significant and positive differentiator.

The voluntary versus mandatory mode of engagement technology influences the relationship between the determiners and behavioral intention to use ICT and IFTK such that police personnel who use ICT and IFTK voluntarily are more likely to believe that voluntary use of technology will positively impact all the determiners of behavioral intentions.

**As one of the police constables opines:**

> *"Eighty percent of my time on duty is spent in the field, on the check posts and sites. There, office-type accessibility is not available, even for simple jobs like checking emails, etc. However, I make it sure to look for avenues to access technology in unorthodox ways. It is purely my inner drive that helps me. I am sure that in the long run, it is going to help me."*

Most internet users were men at the turn of the century (Weiser, 2000). According to ITU (2017) men outnumbered women by 12 percentage points in using information and communication technology. Over the last two decades, research on gendered differentiation of acceptance of technology has been prominent (Beldad et al., 2016; Lian & Yen, 2014; Lin & Hsieh, 2016; Pengnate & Sarathy, 2017; Rodgers & Harris, 2003; Slyke et al., 2010). Consequently, it follows that gender plays an important role in technology acceptance. However, this study throws a contrasting result wherein there is no significant difference between the male and female police personnel adopting technology. The phenomenon can be more historical than otherwise. Women in the police force in varied roles in India is a relatively new phenomenon, and again, a majority of these female police personnel are at least brought up in the digital and information age. Therefore, engagement with technology has become a natural learning process for most of them.

**A female police officer remarked during the interview:**

> *"I learned computers in school and a little bit of programming in college. I come from a semi-urban area. My exposure to computers and internet-based technologies during my graduation helped me cope with the requirements of a technology-enabled workplace. Yes, technology helps a lot and in many ways. My colleagues also help when needed. Sometimes, I do feel some of the technology-driven tasks require advanced training."*

***Gender and Technology Adoption:*** Conventionally, it is understood that female technology users are slow learners and late adopters of technology. With reference to specific determinants of behavioral intention, the gender moderator was influential in affecting the relationship between self-efficacy, social influence, job satisfaction, work efficiency, and behavioral intention such that female police personnel' intention to use ICT and IFTK were more likely to be positively affected by higher self-efficacy, social influence, job satisfaction, and work efficiency. Female police personnel perceive that they are capable of using information technology. They are also positively affected by social group dynamics. It implies that if they find their colleagues engaging with technology, they are likelier to engage with it. The study also highlights that female police personnel are motivated to use technology because they perceive technology use as output-oriented and see it as a catalyst to enhance work efficiency. Similarly, gender has also been shown to have a positive effect on the relationship between the intention to use technology and actual usage behaviour such that females are more likely to have higher behaviour intention leading to higher actual usage.

**A female constable opined the following:**

> *"I grew up in the digital age. I have been using internet-based technology since college. When I joined the police force, I spent considerable time in office work, allowing me to use ICT technologies. It gave me the confidence to take the initiative to use technology interventions in education. When I see my other male and female colleagues using basic internet-based platforms for work, I am influenced by them."*

**A male police person provided a different perspective on gender differences in technology adoption.**

> *"Most of my male colleagues often spent much time in the field and sites away from the office. Therefore, the opportunities to engage with technology during routine tasks are limited for the workforce outside the office. This has a consequence in the long term."*

However, the results also indicate that the group differences between male and female police personnel with respect to the role of Performance expectancy, Effort expectancy, facilitating conditions, and Anxiety are not significant, implying that these dimensions do not play an important role for police personnel to engage with ICT.

*Place of Work and Technology Adoption:* Over half of India's 820 million internet users are from rural areas. This suggests the presence of essential internet access technology infrastructure in rural geography. For an organization like the police department, which deals with many time-sensitive jobs, this is a positive development. As the study highlights, there is a significant difference between police personnel's engagement with ICT and IFTK, which implies that there is a lack of essential infrastructure in terms of access and affordability in rural areas.

**A constable from a rural posting explains:**

> *"When I am on site of crime in rural areas, I am often left with no internet connection or mobile telecommunication network signals. Though I possess a smartphone but at times, it turns out to be useless. I have to resort to landline connectivity at times. Even if there is a mobile network, the speed and bandwidth become a problem."*

Apostolopoulos et al. (2020) defines a rural area as the countryside outside the periphery of urban settlements. These largely also include villages and small settlements. These areas are characterized by limited accessibility and availability of technology artifacts in many ways as

compared to cities. Another important observation from the existing research is a real generic digital divide between rural and urban geographies and demographics (Goswami et al., 2013). The group differences with respect to geographical settings and the determiners of adoption of ICT are mixed. Police person staffed in urban areas have higher perceived self-efficacy, lower anxiety to work with technology, higher perceived performance, higher perceived work efficiency, higher confidence against anxiety and higher actual usage as compared to police personnel who are staffed in rural areas. The results also indicate that geographic setting of the police workforce don't play an important role in the perceived Facilitating conditions, Effort expectancy, Social influence, and job satisfaction. REF For IFTK also, the group differences are highlighted for the following determinants: performance expectancy, social influence, job satisfaction, work efficiency and anxiety. The social group dynamics are more prominent in urban areas as compared to rural areas. This is because in urban areas not only the personal social group is available, but also professional network is also available. Some of these group differences emanates from the fact that there are better support infrastructure and services in the urban areas. The affordability and accessibility of technology artefacts in urban areas if certainly better than rural areas.

**A police women shared her experiences:**

> *"I have worked both in urban and rural postings. The geography of the duty does impact the work. The technology aspect is no different. The accessibility of internet is not as good as in cities. It will have ripple effect on other things. I understand that by using technology, my performance, efficiency, and work flow will improve but I cannot help."*

***Rank and Technology Adoption:*** The police organization in India has a well-established hierarchy of officers and constabulary. The officers come from the Indian Police Service cadre and the Rajasthan Police Service cadre. State service agencies recruit the constabulary. The police hierarchy follows strict protocols and a chain of command. Consequently, the flow of information

and decision-making is affected when protocols are not followed. The study shows that engagement with technology is not affected by the rank of the users in the police force. Police personnel across rank and file manage to use ICT similarly. However, when it comes to specific determiners of behavioural intention, it turns out that Rank is an important moderator of the relationship between determiners and behavioural intention. Officers in the police force are more likely to believe in the impact of determiners and hence are more intently to engaging with ICT technology. Contrarily the findings are different for the use of IFTK. Officers are more likely to use IFTK than constabulary. Rank is an important moderator of the relationship between determiners and behavioural intention. Officers in the police force are more likely to believe in the impact of determiners and hence are more intently to engaging with IFTK technology

**As one police person in the constabulary pointed out:**

> *"I find it easier to use the basic internet-based technology in my work, but I get intimidated when I engage with forensic technology. I am not trained in it. I do believe that technology helps in better outcomes, but it seems in the long run, we need to be more prepared for more efficient integration of technology in policing."*

***Work Experience and Technology Adoption:*** Experience of using a technology artifact provides the user with first-hand inception of aspects of the technology (in this study, ICT and IFTK) which are easy to explore, complex to operate, the technology's usefulness and significance, the technology's anxiety quotient, etc. With persistent use of a particular technology artifact, the negative experiences may turn into positive experiences, paving the way for sustained adoption of the technology artifact. Muchran & Ahmar (2019) opined that experience is an important moderator of the relationship between determiners of behavioural intention to use technology. Taylor and Todd (1995) also suggested a significant difference between user groups with more

experience and less experience to the extent that the more experienced group had a stronger and positive relation with the behavioral intention. In this study, the more experienced police personnel were more comfortable using the ICT and IFTK in their jobs. According to Azam et al. (2010), users' experience with technology is a strong moderator of the intention to use technology. According to this study, the dimension-wise differences in experience groups are significant in the case of determinants of ICT adoption, where the significance appeared in all dimensions. Moreover, the dimension-wise differences in experience groups are significant in the case if determinants IFTK adoption where the significance appeared in all dimensions. The use of forensic technology requires more skilled acquisition of knowledge. In addition, the use of ICT over a period of time provide adequate skills to use it. With experience, the users (police personnel) are better able to appreciate the benefits of using technology. Therefore, there is higher scores on all the determinants of behavioral intention and actual usage for police personnel with experience of 10 or more years.

**An experienced mid-level officer elaborated on his experience with technology:**

> *"In the early phase of my career, I had little experience using the ICT and IFTK and, therefore, found it very intimidating, though I was fairly aware of some of the ICT functionalities. However, I soon realized that technology would be important in my work. As the years progressed and I kept using ICT and IFTK at the workplace, I became comfortable. Today, I even help my junior colleagues to engage with technology."*

**A relatively younger and less experienced constable shared his experience:**

> *"I come from a rural background and have little exposure to technology, particularly desktop-based ICT work and forensics-related technology aspects. I am trying to learn, but I find it hard. One of the reasons is also that I am from a Hindi background."*

***Education Level and Technology Adoption:*** The level of education of a user is a very important aspect in terms of how and to what degree he/she can engage with technology effectively. Technology adoption research with education level as a moderating variable has highlighted mixed findings. Legris et al. (2003) conducted an exhaustive literature review of various moderating variables used in technology adoption studies. They found that users having a higher level of education were less likely to adopt the MIS systems. Al-Gahtani (2003) studied the effect of education on some of the determiners and found that the education level of a user is a significant moderator.  Similarly, Abu-Sharab (2011) found that education level significantly affected the relationship between performance, social influence, self-efficacy, and behavioural intention. In this study, as with many previous studies, education as a moderating variable was not a significant factor in adopting ICT and IFTK. The police personnel in the sample comprised of varied educational backgrounds, including those only school-educated, graduates, and post-graduates. The all-pervasive mobile-based telephony is one of the reasons why education level is not an important factor.

**As one of the female officers remarked:**

> *"I am only a graduate but I could adopt the ICT very quickly. This is because we all*
> *are already using some of the aspects of ICT usage in our daily lives, whether working*
> *or not. So, there is already some level of literacy among us about ICT technology*
> *functionality. Additionally, with sincere effort, the police personnel can learn to use it*
> *because we have our police procedure and process defined very clearly. It is a matter*
> *of integrating technology into these."*

***User Age and Technology Adoption:*** The age of the technology users, in this case, police personnel, and their experience with using technology are related. Although, this is not a linear

relationship. Although the age of the users is considered an important moderating variable (Porter & Donthu, 2006; King & He, 2006), however, it has not received as much attention as other demographic variables (Wang et al., 2009). Tarhini et al. (2014) in their study observed that age is a significant moderator of the effect of ease of use, usefulness, and self-efficacy on behavioural intention. Research also suggests that age difference also affects the perceived difficulty level of the technology itself (Morris et al., 2005). In the current study, it can be seen that police personnel who are in the age group of 50 or more find it difficult to cope with the engagement with ICT and IFTK. The younger age groups find it comfortable to use ICT and IFTK technology artifacts because they have been brought up in the digital age and were exposed to ICT at a younger age.

**A police person above 50 years shared the following:**

> *"Technology (ICT) interventions in policing came at a time when half of my service was over, and it came at a rapid pace. It became difficult to cope with the new forms of technology. I was well-versed in paper-based and legacy systems of work. I was never intimidated by that."*

**A younger police constable remarked:**

> *"Before I joined the police force, I was well-versed in many aspects of Information and Communication technology. Therefore, I found it easy to operate with these artifacts. My awareness of ICT also helped me to adopt the technologies related to IFTK."*

**IFTK Availability and Frequency of Use:** Existing research also delves into investigating the role of availability in technology adoption. The broad observation is that rural areas lag behind urban areas regarding technology availability. (Grubesic & Murray, 2004; Kunin & Blosser, 2003). While this observation is more general, it embodies an important conceptual construct of the current study. Technology availability has been a very important factor for businesses to explore e-commerce (Wymer and Regan, 2005). Support resources and auxiliary services have also been

identified as very important aspects of the overall availability of technology as they influence the usefulness and effort requirements of using technology (Martins & Kellermans, 2004; Mao et al., 2005). Klopping and McKinney (2004) explored the impact of availability on the possibility of performing the expected and desired behaviour.

Davis (1989) postulated that a user finds it helpful to observe the functioning of a technology artifact and then attempts to use it. Consequently, the user has to have the technology artifact available to him/her for practicing to use it before a long-term commitment to using and eventually accepting the technology. This also propounds that the availability also affects how frequently the user can use it. The higher the frequency, the more likely it will be that the user will engage with it availability in this research study has been defined as the 'in-stock ready-to-use availability' of the IFTK. Closely associated conceptual construct is the number of times the IFTK has been utilized, as in the number of cases police personnel has employed the IFTK. As well as the frequency of use of IFTK, as in whether the police personnel uses the IFTK every time he/she is faced with a situation.

**A policeman from a rural post remarked:**

> *"I have been in service for 15 years now. I have served in urban areas also. The availability of resources in urban stations is higher, including technology things as compared to rural areas. The availability affects lot of things such as investigation efficiency and even the outcomes of the cases. I have used the IFTK, but I hope there is more availability in remote areas."*

It follows from such experiences that when police personnel are faced with constraints in terms of resources (availability of IFTK), they tend to ignore it even when it is available. The

ripple effect of such behaviour is that by not engaging regularly and every time with IFTK, there is a high probability of contamination of the scene of investigation and may result in non-compliance with protocols.

**IFTK Training, Perceived Usefulness, and Perceived Significance:** Training with technology is an important influencer of technology adoption because it promotes a positive perception of effort expectancy and usefulness (Srite & Karahanna, 2006). McElroy et al. (2007) pointed out that technology-oriented training led to a favorable assessment of self-efficacy and reduced anxiety about using technology. Gong et al. (2004) also agreed that self-efficacy changes due to extrinsic factors that include training and communication. Stylianou and Jackson (2007) opine that lack of training is a knowledge barrier and significantly affects perceptions about ease of use and usefulness.

Police personnel receive induction training as well as in-service training. Those police personnel who received specific training on the use of IFTK were likelier to engage and adopt the toolkit, while those who did not were less likely to do so. It follows that training helps in reducing aspects such as anxiety and increasing confidence.

**A police officer said:**

> *"When I joined the police force, I underwent rigorous training for all police procedures. There were academic, legal, technical, and non-academic components in the training. The technology component was very small. However, during the course of service I felt that Technology, specifically forensics technology, is becoming increasingly important. I went through in-service training. It helped a lot, and I improved my performance and output."*

**Another police personnel, a young constable, opined:**

> *"I have been using technology in my personal space a lot. However, over the last few years, I have been increasingly faced with technology interventions in my work, and I do feel the need for appropriate training. I feel it will be helpful."*

Perceived usefulness is understood to have a positive and significant effect on technology adoption (Davis et al., 1989). The authors define it as the degree to which the user believes engaging with the technology will improve his/her performance. Similarly, Lederer et al. (2000) also opine that there is a meaningful and strong relationship between usefulness and the actual use of technology. Barhoumi (2016), in his research, underscores the relationship between effort expectancy and usefulness, leading to increased awareness about technology adoption. Technology's usefulness is understood to lead to a success rate in solving crimes, reducing timelines, and serving justice. This is specifically true with forensics technology.

**A police Inspector opined:**

> *"When we find technology useful, we use it; we engage with it. I understand that usefulness leads to scoring success on many of the other aspects of procedures. One thing leads to another. We can accelerate the processes."*

As a determiner of technology adoption, the associated co-construct is the perceived Significance of technology (IFTK). A technology artifact's significance derives itself from its usefulness and relevance in their work. The usefulness of a technology artifact can be derived from how it helps address the problem at hand, while the relevance derives itself from the to what degree it can solve the problem in conjunction with other resources such as time, money, and human resources (Keller, 1987). Along similar lines, Tolman (1932) and Lewin (1935) have advocated

the importance of perceived significance (relevance) through expectancy-value theory. Over the last two decades, IFTK has transformed how complicated and seemingly improbable crimes have been solved while the investigation runs across several years. Moreover, closed crime files have been reopened, and fresh investigations using IFTK have led to success in solving the crime.

## 5.2 Summary

The discussion reveals interesting and potentially significant behavioral aspects of the police personnel when engaging with technology. This chapter discusses results obtained through statistical analysis in the previous chapter. The chapter takes into account the concerned demographic variable and the obtained result pertaining to that demographic variable and then substantiates the finding based on the context of the study, existing research observations, and theoretical groundings. The discussion also embeds the qualitative inputs gathered via the interviews of police personnel and weaves into the narrative discourse into the findings from quantitative analysis. Many of the quantitative findings have been strongly supported by qualitative inputs gained from the interviews. However, there have been some findings that are contrary to existing research; for example, the role of gender as a moderating variable for technology adoption was contrary to popular belief. This also indicates that there are latent extraneous factors, such as an organization's cultural context, that may also play an important role in the technology adoption behavior of the users.

# Chapter 6

# 6.Conclusions

The study presents the research on the technology adoption behaviour of police personnel in Rajasthan with specific reference to two technology artifacts, namely, 1) Information and Communication Technology, and 2) Investigative Forensic Toolkit.

For the purpose of this study, Information and Communication Technology have been used as an umbrella term to define routine technology engagements of police personnel with the internet (mail, databases, websites, online services, telecommunication services, etc.) and hardware artifacts such as mobile phones, smart mobile phones, desktops, laptops, etc. Similarly, the Investigative Forensic Toolkit has been defined as a set of scientific and technological tools used to carry out forensic investigations.

The study illustrates the significance of understanding the technology adoption behaviour of users (police personnel) in making technology interventions and entanglements in the workplace in law enforcement more effective. It underscores the significance of considering individual, group, and external factors that affect the technology adoption behaviour of users (police personnel). Moreover, the research highlights the importance of intermediary factors such as Age, Gender Education, Experience with Technology, Place of Work, Rank of the users, Availability of toolkit, Training with the toolkit, Perceived Significance of the Toolkit, and perceived Usefulness of the Toolkit. These intermediary variables variably moderate the adoption behaviour of the users (police personnel).

The study has used a post-hoc research design whereby the phenomenon of adoption behaviour has been studied as it happened. The study employed a mixed method approach using

quantitative and qualitative methods for data collection, analysis, and explaining the phenomenon. Two survey scales were designed, namely, 1) the Information and Communication Technology Adoption Scale (ICTAS) and 2) the Investigative Forensic ToolKit Adoption Scale (IFTKAS).

The unified Theory of Acceptance and Use of Technology (UTAUT) has been used as a theoretical background for this study. Apart from borrowing the dimensions of technology adoption from the theory, some new dimensions have been contextually added to the model. Additionally, based on the context, some moderating variables have also been added. The variables involved in the study are Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Resources, Anxiety, Self-Efficacy, Job Satisfaction, Workflow Efficiency, Behavioural Intention, and Usage Behaviour. The moderating demographic variables include Age, Gender, Mode of Use, Rank, Place of work, Education, Experience, Perceived Significance of Technology, Perceived Usefulness of Technology, Training, Availability of Toolkit, and Number of Times Toolkit Used.

## 6.1. Major Findings of the Study
**An overview of the significant findings of the study is provided below:**

- The study highlights that there is no significant difference between the two gender groups. It is indicative of the fact that when it comes to the use of technology in work, males and females are equally engaged with it.

- The analysis of data reflects that the use of technology in Urban and Rural geographies, the technology infrastructure and availability play an important role. The rank is not very significant in engaging with technology, implying police personnel across ranks in the hierarchy use the technology with the same intensity. Experience is an important

differentiator, and there is a significant difference between the groups with varied experience. However, the study highlights that education level of users is not very important when it comes to technology engagement.

- This quantitative result indicates no significant difference between the groups across education levels. The study also reflects that there is a significant difference between the groups. It is indicative that when it comes to the use of technology in the workplace, age is important factor and police personnel between age groups 30 to 40 years are more proximal to use of technology.

- The study shows that gender moderates the following determiners of ICT acceptance: Self-efficacy, Social Influence, ICT Usage, Job Satisfaction, Work Efficiency, and Behavioural Intention. the results also indicate that the group differences between male and female police personnel with respect to the role of Performance expectancy, Effort expectancy, facilitating conditions, and Anxiety are not significant, implying that these dimensions do not play an important role for police personnel to engage with ICT.

- Further, Mode of Use-Voluntary/Mandatory moderates the following determiners of ICT acceptance: Self-efficacy, Social Influence, ICT Usage, Job Satisfaction, Work Efficiency, Behavioural Intention, Performance expectancy, Effort expectancy, Facilitating conditions, and Anxiety. The use of ICT in voluntary mode is more self-driven and outcome-oriented, while in mandatory mode, the use of ICT is forced upon.

- The study shows that *Rank (Position in Hierarchy)* moderates the following determiners of ICT acceptance: Self-efficacy, Social Influence, ICT Usage, Job Satisfaction, Work Efficiency, Behavioural Intention, Effort Expectancy, Performance expectancy, Effort expectancy, Facilitating conditions, and Anxiety. The study shows that *Place of Work*

moderates the following determiners of ICT acceptance: Self-efficacy, ICT Usage, Work Efficiency, Behavioural Intention, Performance expectancy, and Anxiety.

- The study also indicates that the geographic setting of the police workforce does not play an important role in the perceived Facilitating conditions, Effort expectancy, Social influence, and job satisfaction.

- The study indicates that there were significant differences between groups of *various degrees of experience* with respect to all the determiners of behavioural intention to use ICT. Facilitating conditions were more important for police personnel with experience of 10 years and above as compared to those who had less experience.

- The study shows that there were significant differences between various age groups with respect to some of the determiners of the adoption of ICT. Police personnel with an Age bracket of 40 years and above give more significance to ICT usage (US), Job Satisfaction (JS), Efficiency at work (WE), and Intention to use ICT (BI) as compared to police personnel of the age group 40 and below. Police personnel with an Educational qualification of graduate and above give more significance to Job Satisfaction (JS) and Efficiency at work (WE), as compared to police personnel of the age group 40 and below.

- This result indicates that there is a significant difference between the Mode of Use (Voluntary and Mandatory) groups for IFTK, the ones who use the ICT technology voluntarily versus the ones who only use it in mandatory conditions. In the two scenarios, voluntary use and mandatory use, the self-motivation to engage technology in workforce becomes very important driver for adoption of IFTK technology.

- This study shows that there is a significant difference between the two groups of Officers and Constabulary. It is indicative of the fact that when it comes to use of technology in the

work, police personnel at higher rank in the hierarchy use the technology with more intensity than those in the lower ranks.

- With respect to gender, the study shows that there is no significant difference between the two groups when it comes to adopting IFTK. It is indicative of the fact that when it comes to the use of technology in work, males and females are equally engaged with it.

- The study also shows a significant difference between the two groups regarding Place of Work. It is indicative of the fact that when it comes to the use of technology in Urban and Rural geographies, the technology infrastructure and technology availability plays an important role.

- This study shows that there is no significant difference between the two groups, the ones who have the toolkit readily available and for those where the toolkit is not readily available.

- Training to use technology is an important part of in-service career growth. The study shows that there is significant difference between the two groups, the ones who have the toolkit training and the ones who don't have the training.

- This implies that in-service continuous training will help the police personnel to keep themselves updated and motivate them to use technology.

- This study also indicates that there is a significant difference between the two groups, the ones who use the toolkit more frequently than those who use it less frequently.

- The research shows that there is no significant difference between the two groups, the ones who believe that the toolkit is a significant technology for crime detection and those who don't believe the same.

- This result indicates that there is no significant difference between the age groups. It is indicative of the fact that when it comes to the use of IFTK in the work, age is not an important factor. However, the result indicates that there is a significant difference between the education groups. It indicates that when it comes to the use of technology in the workplace, the level of education is an important factor to use IFTK.

- In addition, the result indicates that there is a significant difference between the experience groups. It is indicative of the fact that when it comes to the use of IFTK technology in the work, experience in the police service and with using IFTK technology is an important factor.

- This result indicates that there is significant difference between the groups in terms of number of times the police personnel use IFTK. It indicates that when it comes to use of toolkit at workplace, experience with using the toolkit is an important factor influencing toolkit adoption.

- Historically, women's access to IFTK artifacts has been constrained due to various reasons. The table shows that gender only moderates the following determiners of IFTK acceptance: Work Efficiency.

- The Mode of Use moderating variable (Voluntary and Mandatory) is driven by Job Satisfaction,

- Work Efficiency, Anxiety and actual Usage. Those users (police personnel) who are use the IFTK voluntarily rather than under forced circumstances are more likely to do so because they are driven by Job Satisfaction, Work Efficiency, Anxiety and actual Usage. Voluntary use, however do not affect other dimensions.

- The police officers are more likely to use IFTK than the constabulary staff. The rank of the users moderates the determiners of IFTK adoption such that officers are more likely to use IFTK because of performance, effort, social influence, self-efficacy, work efficiency, anxiety, job satisfaction and actual usage.

- The police personnel in urban place of work are more likely to use IFTK than the police personnel posted in rural areas. The place of work moderates the determiners of IFTK adoption such that urban area police personnel are more likely to use IFTK because of performance, social influence, self-efficacy, work efficiency, anxiety, and job satisfaction.

- The likelihood of using IFTK is higher where availability of the IFTK id high. The availability of the IFTK moderates the determiners of IFTK adoption such that facilitating conditions and job satisfaction becomes the driving determiners.

- The police personnel who received training to use IFTK are more likely to use IFTK than the police personnel who didn't. The IFTK training moderates the determiners of IFTK adoption such that police personnel are more likely to use IFTK because of performance, social influence, facilitating conditions, self-efficacy, work efficiency, anxiety, job satisfaction, behavioural intention and actual usage.

- The police personnel who perceive IFTK to be useful are more likely to use IFTK than the police personnel who don't. The IFTK perceived usefulness moderates the determiners of IFTK adoption such that police personnel are more likely to use IFTK because of effort expectancy, anxiety, behavioral intention, and actual usage.

- The police personnel who perceive IFTK to be of significance are more likely to use IFTK than the police personnel who don't. The IFTK perceived significance moderates the

determiners of IFTK adoption such that police personnel are more likely to use IFTK because of effort expectancy, social influence, anxiety, and behavioral intention.

- Facilitating conditions were more important for police personnel with experience of 10 years and above as compared to those who had less experience. This can be attributed to the fact that younger generations' exposure to IFTK happens at an early stage, and they are more proficient with IFTK artifacts.

- Police personnel with an experience bracket of 10 years and above give more significance to self-capabilities (SE), IFTK usage (US), Effort requirement for use of IFTK (EE), Influence of their social network (SI), Job Satisfaction (JS), Efficiency at work (WE), Intention to use IFTK (BI), Anxiety while using IFTK (AX) and improvement in performance when using IFTK (PE) as compared to police personnel with less experience.

- Police personnel with an Age bracket of 40 years and above give more significance to Anxiety while using IFTK (AX) and self-capabilities (SE) to police personnel of the age group 40 and below. However, for Facilitating Conditions (FC), Effort requirement for the use of IFTK (EE), Influence of their social network (SI), actual Usage (US), and improvement in performance when using IFTK (PE). Work Efficiency (WE) and Job Satisfaction (JS) determiners, there was no significant difference between these groups.

- Police personnel with an educational qualification of graduate and above give more significance to Job Satisfaction (JS), Facilitating Conditions (FC), improvement in performance when using IFTK (PE), Anxiety while using IFTK (AX) and IFTK usage (US) as compared to police personnel of the age group 40 and below. However, for Efficiency at work (WE), self-capabilities (SE), Effort requirement for the use of IFTK (EE), Influence of their social network (SI) and Intention to use IFTK (BI) determiners, there was no significant difference between these groups.

- Police personnel who have used the IFTK more than 30 times in their career are more likely to be affected by the Job Satisfaction determiner and their intention to use IFTK will also be influenced positively in contrast to those police personnel who have used it less than 30 times in their career.

- The results show that Police personnel who often use IFTK in their investigations consider self-capabilities (SE), IFTK usage (US), Effort requirement for use of IFTK (EE), Influence of their social network (SI), Job Satisfaction (JS), Efficiency at work (WE), Intention to use IFTK (BI), Anxiety while using IFTK (AX) and improvement in performance when using IFTK (PE) as important factors which facilitates IFTK adoption compared to police personnel use IFTK only sometimes or never use it.

## 6.2. Policy Implications

The findings of the undertaken research yield several policy implications that are proposed below:

- The research outcomes, both qualitative along with quantitative, indicate that contrary to belief there exist a fair degree of motivation among police personnel to engage with technology. To effectively use the technology, the police personnel needs to go through Digital Immersion program in their career. Additionally, as new technologies are innovated, there should be continuous upgradation of skills.

- The facilitating conditions in terms of support structure (physical and human) needs to improve. The improvement is needed in terms of quality of the infrastructure and the volume of infrastructure. It also comes to the for that adequate technology artefacts (such as the investigative forensic toolkits) must be readily made available.

- It also turns out that there is a need to employ technically skilled workforce, as a cadre, to supplement the regular workforce. Also, public-private partnerships in leveraging the technology in policing can be explored for maximum effect.

- Though, the study indicated that technology has been adopted and used in equal measure by both genders, it is suggested that more number of females must become a part of police force to actively participate in technology enabled policing.

- Technology development organization must also take into cognizance that the easier it is to use technology; easier it would be to adopt it. Therefore, technologies specifically used by law enforcement users must take into account their experience with it and feedback about the complexity of storage and retrieval of information.

- Effective use of technology integration into police procedures will not only result into efficient workflows and outcomes, but also help in supplementing the lack of manpower in the concerned departments.

## 6.3 Limitations and Further Scope of the Research

There exist potential concerns that were identified after the completion of the research investigation. The investigation is a cross-sectional examination that could not delve into the process of technology adoption. The investigations into the process of technology adoption would have given meaningful insights into problems faced by police personnel at different phases of technology adoption.

Moreover, the investigation could have been conducted within a comparison approach considering states with higher degree of technology usage in police force with those states with lower degree

of technology usage. Similar, a comparative study could have been undertaken between developed and underdeveloped states.

Furthermore, a more rigorous assessment of socio-cultural aspects into technology integration into one of the important functions of the government. Although appropriate methods were used to obtain verified and wide-ranging details, additional parameters may be established to account for the comprehensiveness of the data gathered from the sample population.

# References

Abbasi, M.S., Chandio, F.H., Soomro, A.F. and Shah, F.(2011). Social Influence, Voluntariness, Experience and the Internet Acceptance: An extension of technology acceptance model within a South-Asian Country Context, Journal of Enterprise Information Management24(1): 30–52

Abner, G., Cullen C. & Rachel Boggs. (2024). How can we help law enforcement agencies learn? A look at CALEA police accreditation. Policing: An International Journal. 47 (1). Emerald.

Abu-Shanab, Emad. (2011). Education level as a technology adoption moderator. 10.1109/ICCRD.2011.5764029.

Ajzen, I. (1991). The Theory of Planned Behavior. Organization Behavior and Human Decision Processes, Academic Press, Inc. 179-211.

Al-Gahtani, Said. (2003). Computer technology adoption in Saudi Arabia: Correlates of perceived innovation attributes. *Information Technology for Development.* 10. 57-69. 10.1002/itdj.1590100106.

Alpert, G.P. and MacDonald, J.M. (2001), "Police use of force: an analysis of organizational characteristics", Justice Quarterly, Vol. 18 No. 2, pp. 393-409.

Aparajita Gupta and Suparna Jain. Building Smart Police In India: Background Into The Needed Police Force Reforms. (2014) Published in https://www.niti.gov.in/niti/writeaddata/files/document_publication/Strengthening-Police-Force.pdf. last accessed on 23rd July, 2019

Apostolopoulos, N.; Liargovas, P.; Stavroyiannis, S.; Makris, I.; Apostolopoulos, S.; Petropoulos, D.; Anastasopoulou, E. Sustaining rural areas, rural tourism enterprises and EU

development policies: A multi-layer conceptualisation of the obstacles in Greece. *Sustainability* 2020, *12*, 7687.

Ariel, B. and Sutherland, A. (2016), "Evidence in focus", Police Professional, No. 507, pp. 22-25

Asen, D. (2017). Song Ci (1186–1249), Father of World Legal Medicine, history, science and forensic culture in contemporary China. International Journal of East Asian Science, Technology and Society.(2): 185–207.

Association of Chief Police Officers (ACPO) (2009) ACPO e-Crime Strategy, London: ACPO

Azam, Md Shah & Quaddus, Mohammed & Rahim, Md. (2010). How experience affects technology acceptance: A quest for ICT development strategies in Bangladesh. 10.1109/ICCITECHN.2010.5723871.

Basten, D. and Haamann, T. (2018), "Approaches for organizational learning: a literature review", Sage Open, Vol. 8 No. 3, doi: 10.1177/2158244018794224.

Bagozzi, R.P. (2007) The Legacy of the Technology Acceptance Model and a Proposal for a Paradigm Shift. Journal of the Association for Information Systems, 8, 244-254.

Barhoumi, C. (2016). User acceptance of the e-information service as information resource. New Library World, 117(9/10), 626-643.

Beldad, A., Hegner, S. and Hoppen, J. (2016),"The effect of virtual sales agent (VSA) gender-product gender congrauence on product advice credibility, trust in VSA and online vendor, and purchase intention", *Computers in Human Behavior*, Vol. 60, pp. 62–72.https://doi.org/10.1016/j.chb.2016.02.046

Bouwman, H. and Lidwien van de Wijngaert. (2009). Coppers context, and conjoints: A reassessment of TAM. Journal of Information Technology. 24

Bouwman, H., L. van de Wijngaert & H. de Vos. (2008). *Context-Sensitive Mobile Services for Police Officers: A Re-assessment of TAM. 7th International Conference on Mobile Business*, Barcelona, Spain, 2008, pp. 191-200, doi: 10.1109/ICMB.2008.18.

Brown, M.M. and Brudney, J.L. (2003), "Learning organisations in the public sector – a study of police agencies employing information and technology to advance knowledge", Public Administration Review, Vol. 63 No. 1, pp. 30-42.

Budhiraja, Renu (2003). "Electronic Governance – A Key issue in the 21st Century". http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN014655.pdf.

Bunyard, R.S. (1978) Police Organisation and Command. First Edition London: Macdonald and Evans Ltd.

Byrne, B. M. (2010). Structural equation modeling with AMOS: Basic concepts, applications, and programming. New York: Routledge.

Chan, J. (2001). The technological game: how information technology is transforming police practice, Criminal Justice, Vol. 1 No. 2, pp. 139-159.

Chaturbedi, J.C. (ed.) (2006) Police Administration and Investigation of Crime. Isha Book Publishers.

Chau, P. Y. K. and Hu, P. J. (2002). Examining a model of information technology acceptance by individual professionals: An exploratory study. Journal of Management Information Systems, 18(4), 191-229.

Chen, C., Lai, H. and Ho, C. (2015). Why Do Teachers Continue to Use Teaching Blogs? The Roles of Perceived Voluntariness and Habit, Computers & Education82(1): 236–249

Colton, K. (1979), "The impact and use of computer technology by the police", Communications of the ACM, Vol. 22 No. 1, pp. 10-20.

Colvin, Caran A., and Angeline Goh. (2005). Validation of the technology acceptance model for police, Journal of Criminal Justice, 33(1).

Dapp, T., Stobbe, A., and Wruuck, P. 2012. The future of (mobile) payments - New (online) players competing with banks, Deutsche Bank Research, 20th December 2012, pp.1-31.

Davis, F. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly, 13(3), 318-340. Retrieved July 15, 2007, from Business Source Complete database.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly, 13(3), 319-340.

Davis, F. D. (1993). User acceptance of information technology: system characteristics, user perceptions and behavioral impacts. International Journal of Man-Machine Studies. 38(3), 475-487

Davis, F. D. and Venkatesh, V. (1996). A critical assessment of potential measurement biases in the technology acceptance model: Three experiments Internet. J. Human-Comput. Stud. 45 19-45.

Davis, F. D., Bogozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. Management Science, 35, 982-1003.

Davis, F.D. (1986). A technology acceptance model for empirically testing new end-user information systems: Theory and results. Massachusetts, United States: Sloan School of Management, Massachusetts Institute of Technology.

Dean, G. and Gottschalk, P. (2007), Knowledge Management in Policing and Law Enforcement, Oxford University Press, Oxford.

Dewan & Chen. (2005). Mobile payment adoption in the US: A cross-industry, cross platform solution. Journal of Information Privacy and Security. 1(2), 4-25.

Doerner, W.G. and Doerner, W.M. (2009), "The diffusion of accreditation among Florida police agencies", Policing: An International Journal of Police Strategies and Management, Vol. 32 No. 4, pp. 781-798.

Doerner, W.M. and Doerner, W.G. (2012), "Police accreditation and clearance rates", Policing: An International Journal of Police Strategies and Management, Vol. 35 No. 1, pp. 6-24.

Dutta, M., & Husain, Z. (2009). Determinants of crime rates: Crime Deterrence and Growth in postliberalized India. Munich Personal RePEc Archive, Article 14478. https://mpra.ub.uni-muenchen.de/14478/

Ellis, M. (2016), "Use of BWV by officers 'invaluable". Police Professional, No. 523, pp. 25.

Ferrandino, J.A. (2014), "The relationship between police minority equity levels and performance outcomes", Journal of Ethnicity in Criminal Justice, Vol. 12 No. 2, pp. 69-92.

Fishbein, M., & Ajzen, I. (1975). Belief, attitude, intention, and behavior: An introduction to theory and research. Reading, Mass; Don Mills, Ontario: Addison-Wesley Pub. Co.

Gaines, Larry. Victor Kappeler, and Joseph Vaughn, Policing in America (3rd ed.), Cincinnati, Ohio: Anderson Publishing Company, 1999.

Gautam, D.N. (1993). The Indian Police, Mittal Publications, New Delhi. pp-133

Gong, M., Xu, Y., & Yu, Y. (2004). An enhanced technology acceptance model for web-based learning. Journal of Information Systems Education, 15(4), 365-374. Retrieved December 20, 2007, from Business Source Complete database.

Goodhue, D. L., & Thompson, R. L. (1995). Task technology fit and individual performance. MIS Quarterly , 19, 213-236.

Goodison, S., Davis, R. C., & Jackson, B. A. (2015). Digital evidence and the U.S. criminal justice system: Identifying technology and other needs to more effectively acquire and utilize digital evidence. Santa Monica, CA: RAND

Goswami, P.; Mahapatra, R.; Divyasukananda, S.; Partha, G. Bridging the digital gap in rural India VIVEKDISHA: A novel experience. In Proceedings of the 2013 National Conference on Communications (NCC), New Delhi, India, 15–17 February 2013; IEEE: Piscataway, NJ, USA, 2013.

Grabosky, P.N. 1998. 'Crime and Technology in The Global Village', Paper presented at the conference: Internet Crime held in Melbourne, 16-18February1998, by the Australian Institute of Criminology.

Grubesic, T., & Murray, A. (2004). Waiting for broadband: Local competition and the spatial distribution of advanced telecommunication services in the United States. Growth & Change, 35(2), 139-165. Retrieved February 1, 2008, from Academic Search Premier database.

Hair, J., Black, W. C., Babin, B. J. & Anderson, R. E. (2010) Multivariate data analysis (7th ed.). Upper Saddle River, New Jersey: Pearson Educational International.

Halder, D., & Jaishankar, K. (2016). Policing Initiatives and Limitations. In: J. Navarro, S.Clevenger, and C. D. Marcum (eds.), The Intersection between Intimate Partner Abuse, Technology, and Cybercrime: Examining the Virtual Enemy (pp. 167 -186). Durham, North Carolina: Carolina Academic Press.

Han, S. (2003). Individual adoption of information systems in organisations: a literature review of technology acceptance model TUCS Technical Report 540; TUCS.

Hao, F., & Sanfelice, V. (2022). How bad is crime for business? Evidence from consumer behavior. Journal of Urban Economics, https://doi.org/10.1016/j.jue.2022.103448

Harring, Sidney, Policing in a Class Society: The Experience of American Cities, 1865-1915, New Brunswick, New Jersey: Rutgers University Press, 1983.

Holliday, B.S. and Wagstaff, J.H. (2022), "The relationship between citizen oversight and procedural justice measures in policing: an exploratory study", American Journal of Criminal Justice, Vol. 47, pp. 567-588.

Hougland, S. and Wolf, R. (2017), "Accreditation in police agencies: does external quality assurance reduce citizen complaints?", The Police Journal, Vol. 90 No. 1, pp. 40-54

Henderson, R. & Divett., M. J. (2003). Perceived usefulness, ease of use and electronic supermarket use. International Journal of Human-Computer Studies, 59, 383-395.

How Kautilya's Arthashastra Shaped The Telling Of Ancient Indian History, Sumedha Verma Ojha - Aug 19, 2016, swarajyamag.com

Jayaradha N and Shanthakumar CK: egovernance (2003), "Tackling the Hurdles". https://www.infitt.org/ti2003/papers/58_jayara.pdf

Joshua J. Mark. (2020). Chanakya. www.ancient.eu

Keller, J. M. (1987). "Development and Use of the ARCS Model of Motivational Design", J.of Instructional Development, vol. 10(3), 1–10

King, W.R. and He, J. (2006) A Meta-Analysis of the Technology Acceptance Model. Information and Management, 43, 740-755. http://dx.doi.org/10.1016/j.im.2006.05.003

Kirby, S. and Turner, G. (2007), "Think crime, think car, think ANPR: the use of ANPR in major crime investigations", The Journal of Homicide and Major Incident Investigation, Vol. 3 No. 2, pp. 35-42.

Klopping, I., & McKinney Jr., E. (2004). Extending the technology acceptance model and the task-technology fit model to consumer e-commerce. Information Technology, Learning & Performance Journal, 22(1), 35-48. Retrieved December 20, 2007, from Business Source Complete database.

Koper, C. S., Lum, C., Willis, J. J., Woods, D. J., & Hibdon, J. (2015). Realizing the potential of technology in policing: A multiside study of the social, organizational, and behavioral aspects of implementing policing technologies. Report to the National Institute of Justice, US Department of Justice. Fairfax, VA: Center for Evidence Based Crime Policy, George Mason University and Police Executive Research Forum

Kunin, C., & Blosser, L. (2003). Congress focuses on wireless and rural broadband. Journal of Internet Law, 6(8), 18. Retrieved February 1, 2008, from Business Source Complete database.

Lai, P. C. (2006). The significant of E-business and knowledge-based Customer Relationship in the E-market Place Environment. INTI Journal, 2(1) 552-559.

Lai, P. C. (2007). The Chip Technology Management Implication in the Era of Globalization: Malaysian Consumers' Perspective, Asia Pacific Business Review, 3(1), 91-96

Lai, P. C. (2010). E-business and E-banking. Japan Society for Software Science and Technology, Itech research group.

Lai, P. C. (2013) Cashless, Cardless, Contactless and Convenience of MySIM™. GlobalCLAS Technology.

Lai, P. C. (2014) Factors influencing consumers' intention to use a single platform E-payment System. UNITEN.

Lai, P. C. (2016) Design and Security impact on consumers' intention to use single platform E-payment, Interdisciplinary Information Sciences, 22(1), 111-122

Lai, P. C. & Ahmad, Z. A. (2014). Perceived Enjoyment of Malaysian consumers' intention to use a single platform E-payment. Paper presented at International Conference on Liberal Arts & Social Sciences., 25th - 29th April, 2014, Hanoi, Vietnam

Lai, P. C. & Zainal, A. A. (2015). Consumers' Intention to Use a Single Platform E-Payment System: A Study among Malaysian Internet and Mobile Banking Users. Journal of Internet Banking and Commerce. 20(1) 1-13

Lai, P. C. & Zainal, A.A (2015). Perceived Risk as an Extension to TAM Model: Consumers' Intention To Use A Single Platform E-Payment. Australia Journal Basic and Applied Science, 9(2): 323-330.

Lederer, A. L., D. J. Maupin, M. P. Sena and Youlong Zhuang. (2000). The technology acceptance model and the World Wide Web, Decision Support Systems, 29(3), Pages 269-282

Lee, T.M., & Jun, J.K. (2007). The role of contextual marketing offer in Mobile commerce acceptance: comparison between Mobile Commerce users and nonusers. International Journal of Mobile Communications, 5(3), 339-356.

Lee, Y., Kozar, K. A., & Larsen, K. R. T. (2003). The technology acceptance model; past, present and future. Communication of AIS, 12(50), 752-780.

Legris, P., Ingham, J., and Collerette, P. (2003). Why Do People Use Information Technology? A Critical Review of the Technology Acceptance Model. *Information & Management* (40:3) 2003, pp. 191-204.

Lewin, K. (1935). A dynamic theory of personality. New York: McGraw-Hill

Lian, J. W. and Yen, D. C. (2014),"Online shopping drivers and barriers for older adults: Age and gender differences", *Computers in Human Behvior*, Vol. 37, pp. 133–143.https://doi.org/10.1016/j.chb.2014.04.028

Lin, C. J. and Hsieh, T. L. (2016),"Exploring the design criteria of website interfaces for gender", *International Journal of Industrial Ergonomics*, Vol. 53, pp. 306–311.https://doi.org/10.1016/j.ergon.2016.02.002

Lovelock, C. 2001. Services Marketing, People, Technology, Strategy, Prentice Hall, New Jersey.

Lu, J., Yu, C. S., Liu, C., & Yao, J. (2003). Technology acceptance model for wireless internet. Journal of Internet Research, 13(2), 206-222.

Luarn, P. & Lin, H. H. 2005. "Toward an understanding of the behavioral intention to use mobile banking." Computers I Human Behavior, 21, 873-891.

Lundman, Robert J., Police and Policing: An Introduction, New York, New York: Holt, Rinehart & Winston, 1980.

Lynch, Michael, Class Based Justice: A History of the Origins of Policing in Albany, Albany, New York: Michael J. Hindelang Criminal Research Justice Center, 1984.

Mao, E., Srite, M., Thatcher, J. B., & Yaprak, O. (2005). A research model for mobile phone service behaviors: Empirical validation in the U.S. and Turkey. Journal of Global Information Technology Management, 8(4), 7-28. Retrieved December 20, 2007, from International Security & Counter Terrorism Reference Center database.

Mamalian, C. A., LaVigne, N. G., & the Staff of the Crime Mapping Research Center. (1999). The use of computerized crime mapping by law enforcement: Survey results. Research Preview. Washington, DC: National Institute of Justice; Retrieved from https://www.ncjrs.gov/pdffiles1/fs000237.pdf

Martins, L., & Kellermanns, F. (2004). A model of business school students' acceptance of a web-based course management system. Academy of Management Learning & Education, 3(1), 7-26. Retrieved December 20, 2007, from Business Source Complete database.

Mathieson, K. (1991). Predicting user intentions: Comparing the technology acceptance model with the theory of planned behavior. Information Systems Research, 2(3), 173-191.

McElroy, J., Hendrickson, A., Townsend, A., & DeMarie, S. (2007). Dispositional factors in internet use: Personality versus cognitive style. MIS Quarterly, 31(4), 809-820. Retrieved December 20, 2007, from Business Source Complete database.

Mehta, A. (2009). Internal (In) Security in India: Challenges and Responses, The Indian Police Journal, Vol. LVI- No. 4, 26-35.

Meuter, M. L., Ostrom, A. L., Roundtree, R. I., & Bitner, M. J. (2000). Self-service technologies: Understanding customer satisfaction with technology-based service encounters. Journal of Marketing, 64(3), 50-65.

Mitra, A. Cyber Crime and the Police: Insinuations to the Police Commissionerate of Bhubaneswar and Cuttack published in Orissa Law Review (2012) pp. 52 – 57.

Moore, M.H. (1992). Problem-solving and Community Policing. Crime Justice, 15: 99-158
Morris, M.G., Venkatesh, V. and Ackerman, P.L. (2005) Gender and Age Differences in Employee Decisions about New Technology: An Extension to the Theory of Planned Behavior. IEEE Transactions on Engineering Management, 52, 69-84.https://doi.org/10.1109/TEM.2004.839967

Muchran, M., & Ahmar, AS (2019). Application of TAM model to the use of information technology. arXiv preprint arXiv:1901.11358

Mun, Y. Yi, Joyce, D. J., Jae, S. P. & Janice, C. P. (2006). Understanding information technology acceptance by individual professionals: Toward an integrative view. Information & Management, 43, 350-363

NCJRS Abstract Japanese Community Police and Police Box System
https://www.ncjrs.gov/App/Publications/abstract.aspx?ID=238599

Neyroud, P. & Wain, N. (2014). Police Training and Reform in India: Bringing Knowledge based Learning to the Indian Police Service. In Stainslas, P. International Perspectives on Police Education and Training.USA: Routledge.

Parker, K.F., MacDonald, J.M., Jennings, W.G. and Alpert, G.P. (2005), "Racial threat, urban conditions and police use of force: assessing the direct and indirect linkages across multiple urban areas", Justice Research and Policy, Vol. 7 No. 1, pp. 53-79.

Pawlowski, S.D. and Robey, D. (2004), "Bridging user organizations: knowledge brokering and the work of information technology professionals", MIS Quarterly, Vol. 28 No. 4, pp. 645-672.

Parasuraman, A., & Colby, L. C. (2001). Techno-Ready Marketing, The Free Press.

Parmar, A. (2017). Role of Government in Preventing Crimes and Lowering Crime Rates in India. Journal of Advances and Scholarly Researches in Allied Education, 13(1). http://ignited.in/I/a/305557

Paul, L., John, I., & Pierre, C. (2003). Why do people use information technology? A critical review of the technology acceptance model. Information & Management, 40, 191-204.

Pengnate, S. and Sarathy, R. (2017), "An experimental investigation of the influence of website emotional design features on trust in unfamiliar online vendor"s, *Computers in Human Behavior*, Vol. 67, pp. 49–60.https://doi.org/10.1016/j.chb.2016.10.018

Platt, Tony, "Crime and Punishment in the United States: Immediate and Long-Term Reforms from a Marxist Perspective, Crime and Social Justice 18 (1982).

Porter, Constance & Donthu, Naveen. (2006). Using the technology acceptance model to explain how attitudes determine Internet usage: The role of perceived access barriers and demographics. J Bus Res.

Pradeep, N. Chaitanya. (2013). Innovations in Police Organisation in India:

Prasad, R. S. (2004) Cyber Crime: An Introduction. ICFAI University Press, India.

Reichel, Philip L., "The Misplaced Emphasis on Urbanization in Police Development," Policing and Society 3 no. 1 (1992).

Rodgers, S. and Harris, M. A. (2003), "Gender and e-commerce: an explortory study", *Journal of Advertising Research*, Vol. 43, No. 3, pp. 322–329.https://doi.org/10.1017/S0021849903030307

Rich, T. (1995). The use of computerized mapping in crime control and prevention programs. Retrieved from http://www.ojp.usdoj.gov/nij/pubs-sum/155182.htm

Rogers, E.M. (1995). Diffusion of Innovations. 4th ed., New York: The Free Press

Roth, J. A., Koper, C. S., White, R., & Langston, E. A. (2000). Using COPS resources. In J. A. Roth & J. F. Ryan (Eds.), National evaluation of the COPS Program—Title I of the 1994 Crime Act (pp. 101–114). Washington, DC: U.S. Department of Justice; Retrieved from https://www.ncjrs.gov/pdffiles1/nij/183643.pdf

Roth & J. F. Ryan (Eds.), National evaluation of the COPS Program—Title I of the 1994 Crime Act (pp. 101–114). Washington, DC: U.S. Department of Justice

Rungsrisawat, S., Jermsittiparsert, K., & Thanetpaksapong, S. (2019). Do the Crime and the SocioEconomic Strain affect the Economic Growth? A Case of an Emerging Asean Economy. Journal of Security and Sustainability Issues, 9(2). http://doi.org/10.9770/jssi.2019.9.2(3)

Savvas, A. (2009), "Police get £25 million for handhelds", available at: www.computerweekly.com/Articles/2008/07/23/231606/police-get-25-million-for-handhelds.html

Shahini, F., Nasr, V., Wozniak, D., & Zahabi, M. (2022). Law enforcement officers' acceptance of advanced driver assistance systems: An application of technology acceptance modeling (TAM). *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, *66*(1), 325-329.

Sheppard, B. H., Hartwick, J., Warshaw, P. R. (1998) The Theory of Reasoned Action: A Meta-Analysis of Past Research with Recommendations for Modifications and Future Research. The Journal of Consumer Research, 15(3) 325-343

Shih, Y.Y. & Fang, K. 2004. The use of a Decomposed Theory of Planned Behavior to study Internet banking in Taiwan. Internet Research, 14(3), 213-223.

Skogan, W., & Frydl, K. (Eds.). (2004). Fairness and effectiveness in policing: The evidence. Washington, DC: National Academies Press.

Smith, B. *et al.* (2000). Differentiating computer experience and attitudes toward computers: An empirical investigation Computers in Human Behavior

Spitzer, Stephen and Andrew Scull, "Privatization and Capitalist Development: The Case of the Private Police," Social Problems 25, no. 1 (1977).

Spitzer, Stephen, "The Rationalization of Crime Control in Capitalist Society," Contemporary Crises 3, no. 1 (1979).

Srite, M., & Karahanna, E. (2006). The role of espoused national cultural values in technology acceptance. MIS Quarterly, 30(3), 679-704. Retrieved December 19, 2007, from Academic Search Premier database.

Stainslas, P. (2014). International Perspectives on Police Education and Training., USA: Routledge.

Storm, K. (2016). *Research on the Impact of Technology on Policing Strategy in the 21st Century*. 2016, RTI International Police Executive Research Forum RTI International 3040 Cornwallis Road Research Triangle Park, NC 27709

Storm, K. (2017). Research on the Impact of Technology on Policing Strategy in the 21st Century, Final Report. National Criminal Justice Reference Service. USA

STRAIGHT LINE Our police in perspective by MUHAMMAD NURUL HUDA ,12:45 AM, May 18, 2013

Study of Two Police Commissionerates. International Conference on Public Administration (ICPA 9th)

Stylianou, A., & Jackson, P. (2007). A comparative examination of individual differences and beliefs on technology usage: Gauging the role of it. Journal of Computer Information Systems, 47(4), 11-18. Retrieved December 20, 2007, from Business Source Complete database.

Suharini, E., Supriyadi, Syifauddin, M., Al-Hanif, E.T., Kurniawan, E., Nugraha, S.B. (2023). An evaluation of community adoption of the InaRISK BNPB platform for disaster management: An application of the Technology Acceptance Model (TAM). International Journal of Safety and Security Engineering, Vol. 13, No. 4, pp. 673-684. https://doi.org/10.18280/ijsse.130409

Sweeting, F.R. and Cole, T. (2023), ""We do employ some morons": police trainers' opinions on recruitment procedures", *Policing: An International Journal*, Vol. 46 No. 3, pp. 461-476. https://doi.org/10.1108/PIJPSM-10-2022-0131

Tam, Kar & Feng, Yue & Lai, Michael. (2019). Effective Use of Policing Systems: A Two-Stage Study of the Shakedown Period of System Implementation. IEEE Transactions on Engineering Management. PP. 1-16. 10.1109/TEM.2019.2938983.

Tarhini, Ali & Hone, Kate & Liu, Xiaohui. (2014). Measuring the Moderating Effect of Gender and Age on E-Learning Acceptance in England: A Structural Equation Modeling Approach for An Extended Technology Acceptance Model. Journal of Educational Computing Research. 51. 163-184. 10.2190/EC.51.2.b.

Tayebi, Nilo,Strand, Susanne J. M. (2013). *Policing stalking: The relationship between police risk assessment, risk management, and recidivism in stalking cases.* Journal of Threat Assessment and Management, Vol 9(3).

Taylor, S. and Todd, P. A. (1995). Understanding Information Technology Usage: A Test of Competing Models. Information Systems Research , 6, 144-176.

Taylor, S., & Todd, P. (1995). Assessing IT usage: The role of prior experience. MIS quarterly , 561-570.

Technological Innovations in Crime Prevention and Policing. A Review of the Research on Implementation and Impact, James Byrne1 and Gary Marx2 Cahiers Politiestudies Jaargang 2011-3, nr. 20 p. 17-40 © Maklu-Uitgevers, ISBN 978-90-466-0412-0 *New*

Technology adoption in diffusion of innovations perspective: introduction of an ERP system in a non-profit organization Marília Queiroz Miranda, Josivania Silva Farias, Carolina de Araújo Schwartz, Juliana Pascualote Lemos de Almeida * *Universidade de Brasília (UNB), Brasília, DF, Brazil* Received 26 October 2015; accepted 5 February 2016 Available online 12 May 2016

Thapa, A. (2022). Crime, Crisis and Economic Growth: An Investigation of SocioEconomic Determinants of Crimes in the Indian States. Eastern Illinois University

The literature review of technology adoption models and theories for the novelty technology, pc lai, HELP University, Malaysia, JISTEM - Journal of Information Systems and Technology Management, vol. 14, no. 1, pp. 21-38, 2017

The rise of the Great British 'bobby': a brief history of Britain's police service https://www.historyextra.com/period/modern/the-rise-of-the-great-british-bobby-a-brief-history-of-britains-police-service/

Tolman, E.C. (1932). Purposive behavior in man and animals. New York: Appleton-Century Crofts, 1932.

Thompson, J. (2022). Awe: Helping leaders address modern policing problems. *Journal of Community Safety and Well-Being*, *7*(2), 53–58. https://doi.org/10.35502/jcswb.239

Tomodachi Spring 2016 Japanese Support for Safety Frameworks Worldwide Sharing the Community-Based Police Model The Japanese Koban System and Residents' Trust, https://www.japan.go.jp/tomodachi/2016/spring2016/sharing_police_model.html

Tsai, H., Compeau, D., & Meister, D. (2017). Voluntary Use of Information Technology: An Analysis and Synthesis of the Literature. *Journal of Information Technology*, *32*(2), 147-162. https://doi.org/10.1057/jit.2016.6

Van Slyke, C., Belanger, F., Johnson, R. D. and Hightower, R. (2010), "Gender-based differences in consumer e-commerce adoption", *Communications of the Assocation for Information Systems*, Vol. 26, No. 1, pp. 17–34.

Venkatesh, V. (2000). Determinants of perceived ease of use: integrating control, intrinsic motivation, and emotion into the technology acceptance model. Information Systems Research, 11(4), 342-365.

Venkatesh, V. and Bala, H. (2008). Technology Acceptance Model 3 and a Research Agenda on Interventions. Decision Science, 39(2), 273-312.

Venkatesh, V., & Davis, F. D. (1996). A model of the antecedents of perceived ease of use: Development and test. Decision Sciences, 27(3), 451-481.

Venkatesh, V., & Davis, F. D. (2000). A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies. Management Science , 46(2), 186-204.

Venkatesh, V., and Morris, M. G. (2000). Why Don't Men Ever Stop to Ask For Directions? Gender, Social Influence, and Their Role in Technology Acceptance and Usage Behavior. MIS Quarterly (24:1), 115-139.

Venkatesh, V., Morris, M.G., Davis, F.D., & Davis, G.B. (2003). User Acceptance of Information Technology: Toward a Unified View. MIS Quarterly, 27, 425-478.

Walker, Samuel, The Police in America: An Introduction, New York, New York: McGraw-Hill, 1996.

Weick, K. E., & Quinn, R. E. (1999). Organizational change and development. *Annual Review of Psychology, 50,* 361–386. https://doi.org/10.1146/annurev.psych.50.1.361

Weiser, E. B. (2000), "Gender differences in Internet use patterns and Internet application preferences: a two-sample comparison", *Cyber Psychology and Behavior*, Vol.3, No. 2, pp. 167–178. https://doi.org/10.1089/109493100316012

Wienroth, M. (2023). Technology in policing, policing in a technological society. Special Issue brief. *International Journal of Police Science & Management*, *25*(3), 223-225.

Wolfe R. (1994). Organizational Innovation: Review, Critique, and Suggested Research Directions. J. Manag. Stud, 31: 405-31

Worrall, L. J. & Schmalleger, F. (2013). Policing. USA: Pearson Education Inc.

Wymer, S., & Regan, E. (2005). Factors influencing e-commerce adoption and use by small and medium businesses. Electronic Markets, 15(4), 438-453. Retrieved September 17, 2007, from Business Source Complete database.

Yang, K.C.C. (2005). Exploring factors affecting the adoption of mobile commerce in Singapore. Telematics and Informatics. 22, 257-277

Yi, M.Y., Jackson, J.D., Park, J.S. & Probst, J.C. (2006). Understanding information technology acceptance by individual professionals: Toward an integrative view. Information & Management , 43(3), 350-363.

Weisburd, D., & Neyroud, P. (2011, January). Police science: Toward a new paradigm. New Perspectives in Policing. Retrieved from https://www.ncjrs.gov/pdffiles1/nij/228922.pd

Aaron Lawrence (Nov, 2018) Law Enforcement Technology that Keeps Police ahead of Crime. Rasmussen College. [Online] https://www.rasmussen.edu/degrees/justice-studies/blog/law-enforcement-technology/. 23rd July, 2019

# Appendices

# Appendices

## APPENDIX - A

## Survey Scale : Information and Communication Technology Adoption Scale (ICTAS)

This scale intends to measure the ICT adoption behaviour of police personnel in Rajasthan Mobile Phones, Laptops, online tools for information mining, legacy software and office suites. Usage here refers to using ICT for police procedurals relevant to the respondent in his job profile.

On the basis of your experience in using ICT, you are requested to fill the responses. It is assured that the information collected would be used for academic and research purpose only and be kept highly confidential. Your support is highly acknowledged.

### Section A - Demographic Information (Moderating Variables)

1. How long have you been using the ICT?
[a] Less than 1 year__ [b] 1-5 years__ [c] 6-10 years___ [d] More than 10 years___
2.You use ICT voluntarily (by your own choice) or under Mandatory Circumstances?
[a] Voluntary___ [b] Mandatory___
3. Professional position: [a] SP/ASP__ [b] ACP/DSP___ [c] CI/SHO __ [d] Insp/ASI/Constable __
4. Educational level: [a] Post Graduate ___ [b] Graduate.__ [c] 12$^{th}$.__[d] 10$^{th}$___(please specify)
5. Gender: [a] Male___ [b] Female ___
6. Age (years): [a] 20-29 years___ [b] 30-39 years___ [c] 40-49 years__ [d] Above 50 years__
7. Current place of Work: [a] Urban _____ [b] Rural: _____

### Section B (Determining Variables)

You are requested to fill your responses for the given statements on a 5-point scale; where 1, 2, 3, 4 and 5 refers to your strong disagreement, disagreement, neutral, agreement and strong agreement responses respectively. **Tick the appropriate option.**

| PERFORMANCE EXPECTANCY: The degree to which an individual believes that usingICT will help him or her to attain improvements in his/her policing tasks. | | | | | |
|---|---|---|---|---|---|
| PE1: ICT enables me to access information relevant to my work activities quickly | 1 | 2 | 3 | 4 | 5 |
| PE2: I can learn more efficiently with the use of ICT helping me to improve my performance. | | | | | |
| PE3:The use of ICT does not improve my job performance. | | | | | |
| PE4: I could see tangible advantage associated with the use of ICT. | | | | | |
| PE5: I am convinced that ICT use will add value to my job activities. | | | | | |

| EFFORT EXPECTANCY: The degree of ease associated with the use of ICT. | | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |

| | | | | | |
|---|---|---|---|---|---|
| EE1: I use ICT because learning to use it is easy for me. | | | | | |
| EE2: I use ICT because I find it easy to use it to do what I want to do. | | | | | |
| EE3: I use ICT because I find it easy to become skillful in using it. | | | | | |
| EE4: I use ICT because I find it easy to use. | | | | | |

**SOCIAL INFLUENCE: The degree to which an individual perceives that people important to him/her believe that he or she should use ICT.**

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| SI1: I use ICT because my peers/colleagues think that I should use it. | | | | | |
| SI2: I use ICT because my family and friends think that I should use it. | | | | | |
| SI3:I use ICT because other teachers think that I should use it. | | | | | |
| SI4:I use ICT because the authorities of my police force think that I should it. | | | | | |
| SI5:I use ICT because in general, my police force has supported the use of it. | | | | | |

**FACILITATING CONDITIONS: The degree to which an individual believes that an organizational and technical infrastructure exists to support the use of ICT.**

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| FC1: I use ICT because the necessary resources (hardware, network etc) are available for me to use it effectively. | | | | | |
| FC2:I use ICT because I can access it very quickly within my Police Department. | | | | | |
| FC3:I use ICT because guidance is available to me to use it effectively. | | | | | |
| FC4:I use ICT because a specific person (or group) is available for assistance with its difficulties. | | | | | |

**SELF-EFFICACY: The degree to which an individual believes that he or she has the ability to perform learning tasks using ICT.**

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| SE1: I use ICT because I feel comfortable when I use it on my own. | | | | | |
| SE2: I use ICT because I am able to use ICT even if there is no one around to show me how to use it. | | | | | |
| SE3: I use ICT because I can complete my task by using it if I can call someone for help if I get stuck. | | | | | |
| SE4: I use ICT because I can complete my task by using it if I have a lot of time. | | | | | |

**JOB SATISFACTION: The degree to which an individual believes that he or she is contented with the use of ICT in their work.**

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| JS1: I use ICT because I feel satisfied with my work at the end of the day. | | | | | |
| JS2: I use ICT because I am able to have a sense of achievement in work. | | | | | |
| JS3: I use ICT because I believe it helps me deal with the demanding work conditions. | | | | | |
| JS4: I use ICT because I believe it gives me a sense of job well done in office and outside. | | | | | |

**WORKFLOW EFFICIENCY: The degree to which an individual believes that he or she is enabling workflow efficiency beyond his/her job by using ICT.**

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| WE1: I use ICT because I feel by doing so I am also making other work easier. | | | | | |
| WE2: I use ICT because I believe I am contributing to smooth and faster flow of information and tasks. | | | | | |
| WE3: I use ICT because I believe the overall organization becomes more efficient by doing so. | | | | | |
| WE4: I use ICT because I believe it helps me execute and delegate the work at hand in a an organized manner. | | | | | |

**Anxiety: Evoking emotional reactions when it comes to useICT.**

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| AX1: I use ICT because I do not feel any kind of hesitation in using it. | | | | | |
| AX2:I use ICT because I do not fear of making any mistakes while using it. | | | | | |
| AX3:I use ICT because I do not feel that I would be misguided by some wrong information. | | | | | |
| AX4:I use ICT because I do not think of loosing information by hitting a wrong key. | | | | | |

| **BEHAVIOUR INTENTION: The degree to which an individual has formulated conscious plans to perform or not perform some specified future behaviour.** | | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| BI1: I intend to use ICT more when working in office. | | | | | |
| BI2:I intend to use ICT more to use it outside in field. | | | | | |
| BI3:I intend to use ICT more for accessing the procedural and routine work in my job. | | | | | |
| BI4:I intend to use ICT more for enhancing my knowledge. | | | | | |

| **USAGE: It is the self-reporting of the actual use that an individual has undertaken.** | | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| UB1: I use ICT for carrying out tasks at my job. | | | | | |
| UB2:I use ICT to learn outside the office in the field work. | | | | | |
| UB3:I use ICT for accessing the relevant information for my job. | | | | | |
| UB4:I use ICT for enhancing my knowledge. | | | | | |

## Thank you for your valuable time.

# APPENDIX - B

## Survey Scale: Investigation and Forensic ToolKit Adoption Scale (IFTKAS)

This scale intends to measure the Investigation and Forensic ToolKit (IFTK) adoption behaviour of police personnel in Rajasthan. Usage here refers to using IFTK for police procedurals relevant to the respondent in his job profile.

On the basis of your experience in using IFTK, you are requested to fill the responses. It is assured that the information collected would be used for academic and research purpose only and be kept highly confidential. Your support is highly acknowledged.

### Section A - Demographic Information (Moderating Variables)

1. How long have you been using the ITK?
[a] Less than 1 year__ [b] 1-5 years__ [c] 6-10 years___ [d] More than 10 years___
2. You use ITK voluntarily (by your own choice) or under Mandatory Circumstances?
[a] Voluntary___ [b] Mandatory___
3. Professional position: [a] SP/ASP__ [b] ACP/DSP___ [c] CI/SHO __ [d] Insp/ASI/Constable __
4. Educational level: [a] Post Graduate ___ [b] Graduate.__ [c] 12th.__[d] 10th___(please specify)
5. Gender: [a] Male___ [b] Female ___
6. Age (years): [a] 20-29 years___ [b] 30-39 years___ [c] 40-49 years__ [d] Above 50 years__
7. Current place of Work: [a] Urban _____ [b] Rural: _____
8. Total number of investigations done so far using the ITK
9. How many times have you used the ITK (a) never (b) sometimes (c) often (d) always
10. Is the ITK available in all the thana's where you have been posted.
11. Have you been trained to use the ITK.
12. Is the ITK useful for the investigations.
13. Does the use of ITK matter at the thana level.

### Section B (Determining Variables)

You are requested to fill your responses for the given statements on a 5-point scale; where 1, 2, 3, 4 and 5 refers to your strong disagreement, disagreement, neutral, agreement and strong agreement responses respectively. **Tick the appropriate option.**

| PERFORMANCE EXPECTANCY: The degree to which an individual believes that using ITK will help him or her to attain improvements in his/her policing tasks. | | | | | |
|---|---|---|---|---|---|
| PE1: ITK enables me to access information relevant to my work activities quickly | 1 | 2 | 3 | 4 | 5 |
| PE2: I can learn more efficiently with the use of ITK helping me to improve my performance. | | | | | |
| PE3: The use of ITK does not improve my job performance. | | | | | |
| PE4: I could see tangible advantage associated with the use of ITK. | | | | | |
| PE5: I am convinced that ITK use will add value to my job activities. | | | | | |

**EFFORT EXPECTANCY: The degree of ease associated with the use of ITK.**

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| EE1: I use ITK because learning to use it is easy for me. | | | | | |
| EE2: I use ITK because I find it easy to use it to do what I want to do. | | | | | |
| EE3: I use ITK because I find it easy to become skillful in using it. | | | | | |
| EE4: I use ITK because I find it easy to use. | | | | | |

**SOCIAL INFLUENCE: The degree to which an individual perceives that people important to him/her believe that he or she should use ITK.**

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| SI1: I use ITK because my peers/colleagues think that I should use it. | | | | | |
| SI2: I use ITK because my family and friends think that I should use it. | | | | | |
| SI3: I use ITK because other teachers think that I should use it. | | | | | |
| SI4: I use ITK because the authorities of my university think that I should it. | | | | | |
| SI5: I use ITK because in general, my university has supported the use of it. | | | | | |

**FACILITATING CONDITIONS: The degree to which an individual believes that an organizational and technical infrastructure exists to support the use of ITK.**

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| FC1: I use ITK because the necessary resources (hardware, network etc) are available for me to use it effectively. | | | | | |
| FC2: I use ITK because I can access it very quickly within my Police Department. | | | | | |
| FC3: I use ITK because guidance is available to me to use it effectively. | | | | | |
| FC4: I use ITK because a specific person (or group) is available for assistance with its difficulties. | | | | | |

**SELF-EFFICACY: The degree to which an individual believes that he or she has the ability to perform professional tasks using ITK.**

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| SE1: I use ITK because I feel comfortable when I use it on my own. | | | | | |
| SE2: I use ITK because I am able to use ITK even if there is no one around to show me how to use it. | | | | | |
| SE3: I use ITK because I can complete my task by using it if I can call someone for help if I get stuck. | | | | | |
| SE4: I use ITK because I can complete my task by using it if I have a lot of time. | | | | | |

**JOB SATISFACTION: The degree to which an individual believes that he or she is contented with the use of ITK in their work.**

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| JS1: I use ITK because I feel satisfied with my work at the end of the day. | | | | | |
| JS 2: I use ITK because I am able to have a sense of achievement in work. | | | | | |
| JS 3: I use ITK because I believe it helps me deal with the demanding work conditions. | | | | | |
| JS 4: I use ITK because I believe it gives me a sense of job well done in office and outside. | | | | | |

**WORKFLOW EFFICIENCY: The degree to which an individual believes that he or she is enabling workflow efficiency beyond his/her job by using ITK.**

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| WE1: I use ITK because I feel by doing so I am also making other work easier. | | | | | |
| WE2: I use ITK because I believe I am contributing to smooth and faster flow of information and tasks. | | | | | |
| WE3: I use ITK because I believe the overall organization becomes more efficient by doing so. | | | | | |
| WE4: I use ITK because I believe it helps me execute and delegate the work at hand in a an organized manner. | | | | | |

| Anxiety: Evoking emotional reactions when it comes to use ITK. | | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| AX1: I use ITK because I do not feel any kind of hesitation in using it. | | | | | |
| AX2: I use ITK because I do not fear of making any mistakes while using it. | | | | | |
| AX3: I use ITK because I do not feel that I would be misguided by some wrong information. | | | | | |
| AX4: I use ITK because I do not think of loosing information by hitting a wrong key. | | | | | |

| BEHAVIOUR INTENTION: The degree to which an individual has formulated conscious plans to perform or not perform some specified future behaviour. | | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| BI1: I intend to use ITK more when working in office. | | | | | |
| BI2: I intend to use ITK more to use it outside in field. | | | | | |
| BI3: I intend to use ITK more for accessing the procedural and routine work in my job. | | | | | |
| BI4: I intend to use ITK more for enhancing my knowledge. | | | | | |

| USAGE: It is the self-reporting of the actual use that an individual has undertaken. | | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| UB1: I use ITK for carrying out tasks at my job. | | | | | |
| UB2: I use ITK to learn outside the office in the field work. | | | | | |
| UB3: I use ITK for accessing the relevant information for my job. | | | | | |
| UB4: I use ITK for enhancing my knowledge. | | | | | |

Thank you for your valuable time.

# APPENDIX - C

## Survey Interview Question Set

This interview set intends to take qualitative inputs regarding the ICT and ITK adoption behaviour of police personnel in Rajasthan. ICT refers to Mobile Phones, Laptops, Online tools for information mining, legacy software and office suites. Usage here refers to using ICT for police procedurals relevant to the respondent in his job profile. Similarly, ITK refers to the conventional investigation kit. It is assured that the information collected would be used for academic and research purpose only and be kept highly confidential. Your support is highly acknowledged.

| Theme | Item No<br>Open Ended Item | Response for ICT | Response for ITK |
|---|---|---|---|
| Performance Expectancy | Do you believe that engagements with technology positively affects performance? Why or Why not? | | |
| Effort Expectancy | Do you think that it is easy to use technology for police personal? Why or Why not? | | |
| Social Influence | Do you think people around police personal affects their engagement with technology? Why or Why not? | | |
| Facilitating Conditions | Do you think that there is adequate and effective support from department for police personal? How? | | |
| Self-Efficacy | Do you think that police personal are adequately skills to use technology? Why or Why not? | | |
| Job Satisfaction | Do you think police personal feel satisfied by using technology as and where required in their job? Why? | | |
| Workflow Efficiency | Do you think the police personal's engagement with technology leads to workflow efficiency in their routine tasks? Why or Why not? | | |
| Anxiety | Do think there is technology fear among police personal when they engage with technology? Why? | | |
| Behavioural Intention | Do you think police personal intend to use technology in their routine tasks/duties/work going forward? Why? | | |
| Actual Usage | Do you think that police personal are adequately using and would keep using technology going forward? Why? | | |

**PERFORMANCE EXPECTANCY:** The degree to which an individual believes that using ICT/ITK will help him or her to attain improvements in his/her policing tasks.
**EFFORT EXPECTANCY:** The degree of ease associated with the use of ICT/ITK.
**SOCIAL INFLUENCE:** The degree to which an individual perceives that people important to him/her believe that he or she should use ICT/ITK.
**FACILITATING CONDITIONS:** The degree to which an individual believes that an organizational and technical infrastructure exists to support the use of ICT/ITK.
**SELF-EFFICACY:** The degree to which an individual believes that he or she has the ability to perform learning tasks using ICT/ITK.
**JOB SATISFACTION:** The degree to which an individual believes that he or she is contented with the use of ICT/ITK in their work.
**WORKFLOW EFFICIENCY:** The degree to which an individual believes that he or she is enabling workflow efficiency beyond his/her job by using ICT/ITK.
**ANXIETY:** Evoking emotional reactions when it comes to use ICT/ITK.
**BEHAVIOUR INTENTION:** The degree to which an individual has formulated conscious plans to perform or not perform some specified future behaviour.
**USAGE:** It is the self-reporting of the actual use that an individual has undertaken.

# APPENDIX – D

## Standing Order regarding Digitization of Case Diaries

कार्यालय महानिदेशक पुलिस, राजस्थान

दिनांक:– 27·12·2023

क्रमांक:–V.15(1)SCRB/CCTNS-Policy/2023-00469/2067

### स्थाई आदेश संख्या 6 / 2023

विषयः– अपराध नियंत्रण एवं अनुसंधान में सीसीटीएनएस का प्रभावी उपयोग – डाटा की शुद्धता एवं पूर्णता।

पुलिस में कम्प्यूटराईजेशन एक सतत प्रकिया है। भविष्य में थानों पर दर्ज प्रकरणों के अनुसंधान / जांच की सम्पूर्ण प्रकिया ऑनलाईन करते हुए मैन्यूएल रूप संधारित की जाने वाली केस फाईल, आपराधिक रिकॉर्ड एवं विभिन्न रिपोर्ट्स / रिकॉर्डस सीसीटीएनएस के माध्यम से ही जनरेट होंगे। न्यायालय के लिये भी सीसीटीएनएस डाटा ऑनलाईन उपयोग हेतु उपलब्ध कराया जाना प्रस्तावित है, ताकि सम्पूर्ण केस फाईल एवं तथ्यात्मक रिपोर्ट न्यायालय को ऑनलाईन ही उपलब्ध करायी जा सके। इसी प्रकार पुलिस विभाग द्वारा किए जाने वाले विभिन्न प्रकार के सत्यापन की प्रकिया को सटीक एवं त्वरित गति से किया जा सकेगा। विभिन्न एआई टूल्स एवं नेफीस सिस्टम को सीसीटीएनएस से इन्टीग्रेटेड किया जाना है। इन सभी वांछित परिणामों के लिये थाना स्तर पर सीसीटीएनएस में प्रविष्ट किये जा रहे डाटा की गुणवत्ता को सुनिश्चित किया जाना अति महत्वपूर्ण है।

गृह विभाग, राजस्थान सरकार के आदेश क्रमांक एफ 16(क)(7) गृह–2 / 2008 पार्ट–1 दिनांक 10.01.2017 एवं इस कार्यालय के आदेश पत्रांक 905 दिनांक 23.02.2017 की पालना में दिनांक 20 मार्च 2017 से राज्य के समस्त पुलिस थानों में सीसीटीएनएस परियोजना का क्रियान्वयन किया गया। इसी क्रम में स्थाई आदेश सं0 19 / 2019 जारी कर अनुसंधान संबंधी समस्त अभिलेखों के डिजिटाईजेशन का विस्तार किया गया।

वर्तमान में पुलिस का सम्पूर्ण अनुसंधानिक कार्य, पंजीकरण, प्रविष्ठि यथा एफआईआर पंजीकरण, अपराध विवरण प्रपत्र (नक्शा मौका), केस डायरी, गवाहों के बयान, परिवाद, गिरफ्तारी प्रपत्र, सम्पत्ति जब्ती, चार्जशीट / एफआर, केस डायरी डाइजेस्ट, रोजनामचाआम, गुमशुदा एवं मर्ग पंजीकरण इत्यादि सीसीटीएनएस एप्लीकेशन पर किये जा रहे हैं।

Signature valid

RajKaj Ref 5102824
Digitally signed by Umesh Mishra
Designation Director General Of Police
Date: 2023.12.27 8:43:35 IST
Reason: Approved

सीसीटीएनएस एक रोलबेस एप्लीकेशन है। सीसीटीएनएस पर कार्य करने के लिये प्रत्येक पुलिस कार्मिक का उसके रोल अनुसार दायित्व निर्धारित है लेकिन पुलिस कार्मिकों द्वारा अपने रोल अनुसार सीसीटीएनएस पर दायित्व निर्वहन नहीं किया जा रहा है अपितु थाना के कुछ चुनिंदा कार्मिकों द्वारा ही सीसीटीएनएस पर सम्पूर्ण कार्य किया जा रहा है। जिस कारण इतना समय व्यतीत हो जाने के बाद भी सीसीटीएनएस से प्राप्त किये जाने वाले सार्थक परिणाम अभी तक वांछित है।

यह भी अनुभव किया गया है कि सीसीटीएनएस में प्रविष्ट किये जा रहे डाटा की गुणवत्ता एवं अनिवार्य प्रविष्ठियों के अतिरिक्त अन्य प्रविष्ठियाँ, जो कि पुलिस कार्यों के लिए महत्वपूर्ण है, उनकी शुद्धता एवं पूर्णता की ओर भी पर्याप्त ध्यान नहीं दिया जा रहा है। जिसके फलस्वरूप सीसीटीएनएस से स्वतः जनित रोजनामचाआम रजिस्टर, आपराधिक रिकॉर्ड, एमसीआर, वीसीएनबी पार्ट 2-3, क्राईम इंडेक्स इत्यादि सभी रिकॉर्ड/रिपोर्ट्स की गुणवत्ता एवं प्रमाणिकता प्रभावित होती है।

सीसीटीएनएस डेटा अशुद्ध, अपूर्ण अथवा त्रुटिपूर्ण होना एक गम्भीर विषय है, जिस पर सुधारात्मक कदम उठाया जाना आवश्यक है। डाटा की शुद्धता एवं पूर्णता से समझौता करने की स्थिति में विधि द्वारा निर्धारित विभिन्न प्रावधानों का उल्लंघन होता है जबकि अनुसंधान की पवित्रता व निष्पक्षता बनाये रखना अपरिहार्य है।

प्रकरणों में अंतिम नतीजा आदेश प्राप्त होने के उपरान्त अनुसंधान अधिकारी द्वारा एक साथ ही सम्बन्धित अनुसंधानिक फार्म्स व केस डायरी का सीसीटीएनएस में इन्द्राज किया जाना डाटा की गुणवत्ता के लिये सही नहीं है। इसी प्रकार केवल अनिवार्य श्रेणियों में ही डेटा इंद्राज करना, अन्य श्रेणियों में गलत/त्रुटिपूर्ण डाटा का इन्द्राज करना झूठी प्रविष्ठि (False Entry) करने के समकक्ष है। ऐसी प्रवृत्ति अनुसंधान अधिकारी के साथ-साथ पर्यवेक्षणीय लापरवाही का भी प्रतीक है।

अतः निर्देशित किया जाता है कि सीसीटीएनएस डाटा की शुद्धता एवं पूर्णता के संबंध में संलग्न **"परिशिष्ट—अ"** में दिये गये दिशा निर्देशों की पालना सुनिश्चित की जाए। इस दिशा में प्रशिक्षण एवं पर्यवेक्षण, दोनों पहलुओं पर आवश्यक उन्नयन अर्जित किये जाने हेतु ठोस प्रभावी कार्यवाही किया जाना सुनिश्चित करें।

संलग्नः— परिशिष्ठ—"अ"।

( उमेश मिश्रा )
महानिदेशक पुलिस
राजस्थान, जयपुर।

ई.ओ.बी. क्रमांकः 206
दिनांकः 27/12/23

प्रतिलिपिः—
1. समस्त अतिरिक्त महानिदेशक पुलिस, राज0 जयपुर।
2. पुलिस आयुक्त जयपुर / जोधपुर।
3. समस्त महानिरीक्षक पुलिस, राज0 जयपुर।
4. समस्त पुलिस अधीक्षक राज0 जयपुर मय जीआरपी राज0 जयपुर।
5. आदेश पंजिका।

महानिदेशक पुलिस
राजस्थान, जयपुर।

X

# APPENDIX – E

## Photographs of Interaction with Police personnel

**Interacting with Police Station personnel of Gagel (Ajmer)**

# Interaction with Police personnel at Police Station Govindgarh (Jaipur Gramin)



## Enquiring about Investigation Tool Kit

## Enquiring about CCTNS

# Interaction with Police personnel at Police Station Samod (Jaipur Gramin)

# List of Publications and Conferences

<u>**Publications**</u>

1. Mishra, U., V S Nirban and Tanu Shukla. (2022). Information and Communication Technology Acceptance among Police Personnel in Rajasthan. In: Fong, S, Dey, N., Joshi, A. (Eds). ICT Analysis and Applications in Networks and Systems, Vol 315, Springer

2. Mishra, U. and V S Nirban. (2024). Investigative and Forensic Toolkit Usage and Determinants of Adoption Behaviour among Police Personnel. Mind and Society. 13(2): 40-46. doi: 10.56011/mind-mri-132-20246

<u>**Conferences**</u>

1. Presented a paper on "eGovernance Effectiveness: Insights from Forensic Technology Use in policing " at the International Conference on Intersections of Interdisciplinarity, at BITS Pilani, Pilani Campus during 23-24 February, 2024.
2. Presented a paper on Technology Adoption for Sustainable Policing in Rajasthan International Conference on Technology for Sustainable Development, KCCI, 29th-30th July, 2022, Goa, India
3. Speaker at National Conference on Technology Based Policing held at Sardar Patel University of Police, Security and Criminal Justice in Jodhpur, Rajasthan, India

# Biography:

## Prof. V S Nirban

Prof. Virendra Singh Nirban is a Professor of Communication and Media Studies with the department of Humanities and Social Sciences at the BITS-Pilani. The focus of his research lies in the understanding of human interaction with technology, particularly ICT and its effect on behavioural aspects of the users. He has published several research papers in journals of repute. He has successfully sourced research funding for projects and has completed them. He has four books published as author and co-author.

## Prof. Chandra Shekhar

**Professor Chandra Shekhar** obtained his M.Sc. and Ph.D. degrees in Physics from BITS Pilani. Thereafter, he moved to CEERI, Pilani as Scientist 'B'. He has served as Director of CEERI 2003 to 2016. Dr. Chandra Shekhar also played a key role in the formulation and execution of Government of India, Department of Electronics' national initiatives in Microelectronics research and education through various research-focused programs and the well-known "Special Manpower Development Program for VLSI Design and related software. Dr. Chandra Shekhar has been awarded UNESCO/ROSTSCA Young Scientist Award in 1986, CEERI Foundation Day Merit award in the year 1988, ISHEER Science Councilor Award in 2005, Prof. L K Maheshwari Foundation Distinguished Alumnus Award in 2010, Doctor of Science (honoris causa) by NIT Kurukshetra in 2012 and IETE Diamond Jubilee Gold Medal award in the year 2013. The Distinguished Alumnus Award in the Category of Professional management of businesses is awarded to Dr. Chandra Shekhar, in recognition of his outstanding contributions to society. Dr. Chandra Shekhar has been appointed Chairperson and Chancellor of Academy of Scientific and Innovative Research by Govt of India.

## Mr. Umesh Mishra

Mr. Umesh Mishra is a former IPS having served as Director General, Police, Rajasthan. He had a long career in India Police Service in Rajasthan cadre. He has a background in Philosophy and has interest in academic and research. He has served in several capacities in police department at State and Center. He has attended international and national conferences and police department seminars regularly.