Mind and Society
A Peer Reviewed Research Journal in Humanities and Social Sciences

EMPIRICAL ARTICLE
ISSN:2277-6907
doi: 10.56011/mind-mri-132-20246

Investigative Forensic Toolkit Usage and Determinants of Adoption Behavior Among Police Personnel

Umesh Mishra[1*], V. S. Nirban[2]

[1]*Research Scholar, Department of Humanities and Social Sciences, Birla Institute of Technology and Science (BITS), Pilani, Rajasthan, India.*

[2]*Professor, Department of Humanities and Social Sciences, Birla Institute of Technology and Science (BITS), Pilani, Rajasthan, India.*

Abstract

Over the last two decades, technology has become integral to personal and professional spheres. There has been unprecedented and rapid innovation in technology artifacts and their use for development and empowerment. Similarly, technology has been a part of governance for a long time. The basic objective of this paper is to understand the technology adoption behavior of police personnel in Rajasthan, India, and to identify factors that determine the technology adoption behavior of police personnel. The study's goals are not only to advance theory on the relationship between technology and policing but also a) to understand the technology adoption behavior of police personnel in Rajasthan, India, and b) to identify factors that determine the technology adoption behavior of the police personnel. In pursuit of the above goals, the focus was primarily on technologies relevant to policing. We have selected the Forensic Toolkit as the technology artifact for this study. The study employs the quantitative method for data collection. Descriptive and inferential statistics have been used in the paper for analysis.

ARTICLE INFO

Correspondence:
Umesh Mishra
p20180107@pilani.bits-pilani.ac.in
Research Scholar, Department of Humanities and Social Sciences, Birla Institute of Technology and Science (BITS), Pilani, Rajasthan, India.

Dates:
Received: 05-05-2024
Accepted: 10-07-2024
Published: 02-08-2024

Keywords:
Technology adoption, Forensic technology, Policing, Digital intervention, Law enforcement.

How to Cite:
Mishra, U., Nirban, V. S. Investigative Forensic Toolkit Usage and Determinants of Adoption Behavior Among Police Personnel. Mind and Society. 2024;13(2): 40-46.
doi: 10.56011/mind-mri-132-20246

Introduction

Over the last two decades, technology has become integral to personal and professional spheres. There has been unprecedented and rapid innovation in technology artifacts and their use for development and empowerment. The evolution of technology has offered multiple avenues for users to engage. However, not all technology platforms are used and are eventually accepted or adopted by the users. Understanding the factors and determinants of the users' adoption behavior is critical to comprehend what motivates them to accept or reject the technology artifact. An investigative forensic toolkit (IFT) used by police personnel is a set of hardware and software tools to help collect and collate evidence from the crime site and its follow-through during the investigation. Artifacts such as fingerprint collection tools, site closure tools, blood sample picking tools, and IFTK tools to record this evidence are some examples of IFT. Though these are routine tools to investigate, for various reasons, their effective use is always compromised. It is in this context that the use and adoption

behavior of police personnel becomes important to study and to identify those determinants that motivate them to use or discard them.

For the purpose of this study, we have employed the Unified Theory of Acceptance and Use of Technology (UTAUT), as proposed by Venkatesh et al. (Venkatesh, Morris, Davis, & Davis, 2003), with some modifications to the variables. The theory amalgamates several existing theories, putting together the most important determiners of using technology in the workplace. The model uses seven key constructs: performance expectancy (PE), effort expectancy (EE), social influence (SI), self-efficacy (SE), and facilitating conditions (FC). Together, they influence use behavior (UB) directly or through an intermediate construct, the behavioral intention to use (BI). This study does not use the moderating variables proposed by the authors. The study's objectives are 1) to understand the technology adoption behavior of police personnel in Rajasthan, India, and 2) to identify factors that determine the technology adoption behavior of the police personnel.

Technology innovation and technology penetration among the masses are two critical phenomena in the last two decades of the twenty-first century. As the case is in all spheres of life, policing and law enforcement, have also seen widespread use of technology in domains such as crime record information storage and retrieval, sharing and dissemination of information, and mapping of crimes (Higgins, 2015).

Conventional methods of planning and execution of procedures in governance are less effective in terms of cost, time, communication, and other aspects such as transparency of process (U.S. Department of Justice [USDJ], 2012). The developed countries realized the potential of technological interventions early. Compared to developing countries, which only saw the benefits of technology use in governance in the last two decades (Mkude, 2016), developed countries realized the potential of technology interventions early. Denef et al. (2011), in addition, argue that implementing technology interventions in policing requires social and cultural considerations.

Colvin and Goh (2005) have employed the technology acceptance model to validate its effectiveness in explaining technology adoption behavior among police personnel. Their study observed that a correct combination of the degree of ease of use, the usefulness of technology, and the complexity of the information being dealt with leads to a higher degree of technology adoption. Williams and Aasheim (2005), in their study, emphasized the police's realization of the significance of technology-based interventions in policing and opined that after using these interventions, crime rates declined. This observation was further highlighted by Ozdemir (2004), wherein the author noted that technology can play a very important and influential role in human communication aspects, such as the deployment of female officers and constabulary for interactions with accused and suspects. The research noted that the female officers and constabulary staff found it difficult and uncomfortable to interact with such persons face-to-face. According to Hendrix et al. (2017), the relationship between police organizations and the adoption of technology is driven by organizational choices. These choices may vary from being a rational strategy to a contingency choice.

According to Manning (2088), the Investigative Forensic Toolkit (IFTK) technologies possess a high level of complexity and are applicable in a variety of scenarios. They can be utilized not only for difficult and complex tasks but also for soft tasks, such as monitoring the well-being of prisoners and criminals (Hickman *et al.*, 2011). In its early phases, technology inception within the police workforce was in the backroom process; however, now, it has come to the forefront of policing and crime control and monitoring (Manning, 2003). Image (face) recognition, displacement (movement) monitoring, and text trailing are some of the more contemporary applications in policing. Mueller (2006) also suggested that information and communication technology tools can help convert the data into readily usable intelligence for police personnel, leading to an increase in efficiency and productivity.

The availability, accessibility, and affordability of technology artifacts such as devices, networks, and software applications have largely enabled users (police personnel) to employ technology in their fieldwork (George Avalos, Contra Costa Times, January 18, 2016). However, certain concerns remain about individual privacy and trespassing on people's personal space (Bellamy, 2011).

The context of technology acceptance in policing encompasses geographic and demographic aspects, including ranges, Commissionerate, circles, officers, experts, and administrators in the police agency. Therefore, technology adoption in policing cannot be seen as a material intrusion, but it has to be seen from a social perspective as well (Ackroyd et al., 1992; Manning, 1992a; Orlikowski & Gash, 1994). Technology has made it difficult for criminals to carry out crimes because of enhanced surveillance (Grabosky, 1998). Also, technology use has led to increased productivity by positively affecting police personnel's capabilities (Koper, Lum, and Willis, 2014). Some technological innovations utilized in the second half of the last century include radio wireless communication, automation in dispatch systems, and motorized policing (Koper, Lum, & Wills, 2014). The twenty-first century saw the focus shift to empowering policemen to execute their work efficiently. Technology has also yielded effective results (Mitra, 2012). Policing in India, with the help of technology interventions, has seen few successful implementations.

The police department in Karnataka state of India has implemented the Police IT project to digitize police and enforcement processes, smooth communication flow, and so on. Grabosky (1998) suggests that when implementing technology, it's important to take into account social aspects, as they represent the interaction between humans and technology. The literature review emphasizes that there have been technological interventions in policing in a variety of ways. However, there is a lack of research bodies in the Indian context, particularly those that target the study of the adoption behavior of police personnel, which bring to the forefront the factors that motivate the police personnel to use and adopt technology interventions.

Objectives and Hypotheses

The study's objectives are as follows:

- To understand the technology adoption behavior of police personnel in Rajasthan, India.
- To identify factors that determine the technology adoption behavior of police personnel.

The following hypotheses were made to test the data:

Hypothesis 1: Performance expectancy will positively influence the intention to use IFTK among police personnel.

Hypothesis 2: Effort expectancy will positively influence the intention to use IFTK among police personnel.

Hypothesis 3: Social influence will positively influence the intention to use IFTK among police personnel.

Hypothesis 4: Self-efficacy will positively influence the intention of usage towards IFTK among police personnel.

Hypothesis 5: Anxiety will positively influence the intention of usage towards IFTK among police personnel.

Hypothesis 6: Facilitating conditions will positively influence the usage of IFTK among police personnel.

Hypothesis 7: The intention of usage will positively influence the usage of IFTK among police personnel.

Method

This study aims to analyze what factors are more significant in determining the acceptance of IFTK by police personnel. We chose UTAUT as the base model for this study because the literature review suggested it explains technology acceptance and usage behavior with a high degree of accuracy and covers essential factors that may influence acceptance behavior.

Research Design

The study employed a post-hoc research design to investigate the technology adoption behavior of the selected population. We executed the research design using a quantitative method and a survey tool. The survey's design was based on the theoretical framework of the Unified Theory of Use and Acceptance of Technology. To suit the context, we drafted the dimensions of adoption behavior and their items. The introduction section enumerates the key constructs used in this study.

Sample

The study used a sample size of 100 police personnel. Following a systematic random selection of respon-

dents, we distributed 100 questionnaires, and after careful consideration, we included 92 completed and valid questionnaires in the study.

Measuring Tool and Procedure

We selected the dimensions of technology acceptance behavior based on the UTAUT theory and drafted the items accordingly. The questionnaire included a brief explanation of the term IFTK and instructions on how to complete it. We collected the data from two police ranges and one commissioner. We identified the police circles within these ranges and sourced a list of police personnel from these circles. We used the systematic random sampling method to draw a sample from the list. We used Cronbach's alpha as a statistic to check the reliability of the measurement tool, and its value of 0.832 indicated that the survey tool was reliable. We used the skewness and kurtosis values to determine the normality of the data distribution. The skewness value for the survey tool is.326, while the kurtosis value is 0.654. This demonstrated the normal distribution of the data.

Analysis

We compiled and analyzed the data using SPSS. We utilized descriptive and inferential statistics to render and analyze the results. We executed Pearson's correlation to understand the relationship between distinct variables, as demonstrated in the following tables. We performed linear regression to establish causation because the data satisfied all the assumptions of parametric statistics.

Results

The coefficient of correlation between the different technology adoption constructs are presented in Table 1.

Table 2a and Table 2b presents a model of regression test. It indicates that Performance, Effort and social network influence the intention of users (police personnel) to use IFTK. Individual efficacy (SE) and nervousness (AX) did not affect the intention of users (police personnel) to use IFTK. Table 2b shows the model of regression relationship between facilitating infrastructure (FC) and Users' Intention

Table 1: Inter-correlation between the technology adoption constructs

	Performance Expectancy	*Effort Expectancy*	*Social Influence*	*Anxiety*	*Self-Efficacy*	*Facilitating Conditions*	*Behavioral Intention*	*Usage Behavior*
Performance Expectancy	1							
Effort Expectancy	.819**	1						
Social Influence	.632**	.698**	1					
Anxiety	.572**	.653**	.783**	1				
Self-Efficacy	.734**	.569**	.673**	.692**	1			
Facilitating Conditions	.578**	.612**	.632**	.698**	.652**	1		
Behavioral Intention	.657**	.675**	.579**	.596**	.598**	.611**	1	
Usage Behavior	.629**	.732**	.598**	.641**	.687**	.676**	.701**	1

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

Table 2a: Regression results- dependent variable: Behavioral intention

Model one summary

					Change statistics				
Model	*R*	*R cquare*	*Adjusted R square*	*Std. error of the estimate*	*R square Change*	*F change*	*df1*	*df2*	*Sig. F Change*
1	.752[a]	.654	.592	3.55226	.654	30.208	5	92	.000

a. Predictors: (Constant), ITK_Anxiety, ITK_Effort_expectancy, ITK_Performance_expectancy, ITK_Social_Influence, ITK_Self_Efficacy

Table 2b: Beta coefficients for model one

Model	Unstandardized coefficients		Standardized coefficients	T	Sig.
	B	Std. Error	Beta		
ITK_PE_T	.343	.081	.291	1.620	.000
ITK_EE_T	.217	.045	.326	.717	.000
ITK_SI_T	.126	.078	.178	3.870	.000
ITK_SE_T	.144	.078	.107	2.146	.067
ITK_AX_T	.158	.083	.138	2.286	.321

(IU) with usage behavior. Results indicate that facilitating infrastructure (FC) and Users' Intention (IU) is directly and positively related to usage behavior with respect to IFTK by police personnel. The analysis of the model of regression reflects that perceived performance has a significant (B = .291, p <.001) relationship with the users' intention to engage with IFTK. Similarly, the regression shows that ease of use (Effort) is significantly (B = .326, p <.001) related to the users' intention to use IFTK. Social influence, likewise, is significantly (B = .178, p <.001) affecting the users' intention to use IFTK. A user's self-capability to use technology (Self-efficacy) and blockade to use technology (Anxiety) are not important determinants of their intention to use IFTK.

As depicted in Tables 2c and d, the supporting infrastructure to use technology (Facilitating Conditions) is significantly (B= .247, p <.001) related to the users' (policeperson) actual usage behavior of IFTK. The Intention of Use is also significantly (B= .189, p <.001) related to the users' actual usage behavior of IFTK.

The regression analysis also depicts that in model one (Table 2b), the R-square value is .654, implying that this regression model explains approximately 65% of the variance in the behavioral intention of the users (police personnel). Likewise, in model two (Table 2d), the R-square value is .589, implying that this regression model explains approximately 58% of the variance in the usage behavior of the users (police personnel).

Based on the results, the findings corroborate the hypotheses 1, 2, 3, 6, and 7. In contrast, the findings reject hypotheses 4 and 5.

Discussion

Performance, effort, and social network influence clearly determine the intent to use IFTK. Self-efficacy and anxiety are not the significant determiners. Moreover, facilitating conditions and a positive intention eventually led to actual usage. This indicates users' desire to deliver effective output in their work. Police personnel who perceive technology as easy to use or believe the effort required to engage with it is minimal are more likely to have a positive attitude toward its use. Additionally, the police personnel's observation of other important people in their social and peer networks using the technology motivates them to use it.

From a policy perspective, the results are clear. Since performance expectancy has emerged as a significant determinant, we can make the work culture of the police organization more performance-oriented. Police personnel believe that using forensics technology can enhance their performance; therefore, linking job outcomes to performance can motivate them to engage with technology. Similarly, the results indicate that social group behavior is an essential indicator of technology adoption. In this study, the respondents felt that their peers, seniors, and subordinates' technology engagement influenced them. Therefore, a group behavior for using technology at the workplace to achieve the desired outcomes can be implemented.

Table 2c: Regression results- dependent variable: Usage behavior

Model two summary									
Model	R	R square	Adjusted R square	Std. error of the estimate	Change Statistics				
					R square change	F change	df1	df2	Sig. F change
1	.765[a]	.589	.498	3.29712	.589	64.941	2	92	.000

a. Predictors: (Constant), ITK_Behavioral _Intention, ITK_Facilitating_Conditions

Table 2d: Beta coefficients for model two

Model	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Std. Error	Beta		
ITK_FC_T	.280	.042	.189	6.643	.000
ITK_BI_T	.275	.048	.247	5.782	.000

This will help inculcate and percolate group behavior among the group constituents. In-service training and teamwork can help achieve these objectives. There are also policy implications for technology developers. Effort expectancy has also become an essential indicator of behavioral intention. The results indicate that the effort to use technology is proportional to the degree of intention. We can deduce that technology developers must design user-friendly system interfaces and workflows.

Facilitating conditions remains an essential pillar for integrating technological interventions in any domain. Unlike other constructs, the quality of primary and auxiliary infrastructure comes before other factors directly influencing usage behavior rather than intention. Despite positive intentions, users will unlikely use technology if effective support and technical infrastructure are absent. Any behavioral action would only materialize if there was an intention to act. A proportional intention drives any degree of technology usage.

Conclusion

The study highlights that there are intrinsic and extrinsic factors that can affect police personnel's behavior while engaging with technology. This study draws its theoretical grounding from the unified theory of use and acceptance of technology. The study's purpose was to identify the study's significant determinants. The results indicate that the technology's (IFTK's) perceived ability to improve performance, the perceived amount of effort to use the technology, and the degree of use of technology by peers and social groups of an individual affect the user's intention to use it. Users' positive intentions, in turn, positively influence them to engage with technology. Also, the infrastructure for facilitating the technology plays an important role in its user adoption. For further inquiry into the phenomenon of technology acceptance by police personnel, the scope lies in accounting for moderating variables such as gender, place of work, education, experience, and rank of the police personnel.

References

1. Ackroyd, S., Harper, R., Hughes, J.A., Shapiro, D. & Soothill K. (1992). *New Technology and Practical Police Work*. Open University Press, Buckingham.
2. Bellamy, C. (2011). Alive and well? The 'surveillance society' and the coalition. *Public Policy and Administration*, 26 (1), 149-155.
3. Colvin, C.A. & Goh, A. (2005). Validation of the technology acceptance model for police. *Journal of Crime Justice*, 33 (1), 89-95.
4. Denef, S., Kaptein, N., Bayerl, P., & Leornardo, R. (2011). *ICT Trends in European policing. Retrieved from Composite Project of EU*.
5. George AvalosContra Costa Times (Walnut Creek, Calif.) Distributed by Tribune Content Agency, LLC. https://www.govtech.com/dc/police-use-new-technologies-to-fight-crime.html
6. Grabosky, P.N. (1998). Crime and Technology in The Global Village', *Paper presented at the conference: Internet Crime held in Melbourne*, 16-18 February, 1998, by the Australian Institute of Criminology.
7. Hendrix, J. A., Taniguchi, T., Strom, K. J., Aagaard, B., & Johnson, N. (2017). Strategic policing philosophy and the acquisition of technology: Findings from a nationally representative survey of law enforcement. *Policing and Society*, 1–17.
8. Hickman, M. and Atherley, L. (2011). Police Use of Force in Seattle, January 2009–March 2011. *Northwest Justice Solutions*.
9. Higgins, E. M., & Rolfe, S. M. (2017). The sleeping army: Necropolitics and the collateral consequences of being a sex offender. *Deviant behavior*, 38(9), 975-990.
10. Koper, C.S., Lum, C., & Willis, J.J. (2014). Realizing the potential of technology for policing. *Translational Criminology*, Fall 2014, 9-10, 17.
11. Manning, P.K. (2018). *The Technology of Policing: Crime Mapping, Information Technology, and The Rationality of Crime Control*. New York. New York University Press.
12. Manning, Peter. (2003). *Policing Contingencies. Bibliovault OAI Repository.* The University of Chicago Press. 10.7208/chicago/9780226503523.001.0001.
13. Mkude, C. G. (2016). *Framework for E-Government Systems Design and Implementation for Developing Countries*. Fölbach Verlag, Koblenz, Germany.
14. Mitra, A. (2012). *Cyber Crime and the Police: Insinuations to the Police Commissionerate of Bhubaneswar and Cuttack*. Orissa Law Review, 52 – 57.
15. Mueller, R. S. (2006). The art of information. *Vital*

Speeches of the Day, 72 (14/15), 434-437.
16. Orlikowski, W.J. & Gash, D.C. (1994). Technological Frames — Making Sense of Information Technology in Organizations. *ACM Transactions on Information Systems*, 12(2), 174–207.
17. Ozdemir, H. (2004). An examination of the need to establish cultural literacy in police administration. *Turkish Journal of Police Studies*, 6(3-4), pp. 95-114.
18. Venkatesh, V; Morris, Michael G.; Davis, Gordon B.; Davis, Fred D. (2003). User Acceptance of Information Technology: Toward a Unified View. *MIS Quarterly*. 27 (3): 425–478.