



Modelling AI Acceptance in Digital Forensic Studies through Correlational Analysis and Regression Metrics

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Abstract

Artificial Intelligence (AI) in digital forensic investigations is reshaping evidence analysis, and decision-making. However, the readiness of emerging forensic professionals to adopt these technologies remains underexplored. This cross-sectional study has investigated the awareness, acceptance, and ethical perceptions of AI adoption in digital forensics among academicians from forensics and allied disciplines. A structured questionnaire, based on Technology Acceptance Model (TAM) and its extended constructs, has been administered to a purposive sampling via google form. The questionnaire has measured key dimensions including awareness, perceived usefulness (PU), perceived ease of use (PEOU), social influence (SI), ethical concerns (EC), trust, and behavioural intention (TBI) using five-point Likert scales. A total of 200 participants from forensic sciences, computer sciences, and cyber/digital forensics domains have responded and completed the survey. Response data has been coded and analyzed in Microsoft Excel, 2019 using spearman correlation and simple linear regression. All 5 regression models have shown statistically significant positive relationships with awareness ($p < 0.001$). The explained variances (R^2) have highlighted SI as the strongest predictor ($R^2 = 0.4096$), followed by PEOU ($R^2 = 0.3765$), TBI ($R^2 = 0.2844$), PU ($R^2 = 0.2529$), and EC ($R^2 = 0.2205$). These key findings have indicated that, higher awareness strongly enhances perceived ease of usefulness, perceived usefulness, social influence along with ethical sensitivity, and intention to adopt AI-based forensic tools. Additionally, EC score has shown a strong correlation with TBI ($R = 0.63$; $R^2 = 0.3974$; $p < 0.001$), underlining a major finding that, ethical sensitivity promotes responsible trust rather than upward rejection of

AI. This study has highlighted the necessity for structured AI literacy, ethics modules, and institutional support in digital forensic academic curricula.

Keywords: Artificial Intelligence, Technology Acceptance Model, Ethical Sensitivity, Responsible Trust, Academic Curricula

1. Introduction

Digital forensic science is evolving, and with the increasing complexity of cybercrimes, the forensic practitioners and researchers are utilizing AI driven systems to improve the data analysis (Dunsin et al., 2024; Qureshi et al., 2024). AI has been successfully employed for malware classification, image and video forgery detection, log analysis, network intrusion identification, and automation of large digital datasets (Akeiber, 2025; Syifaurachman, 2025). These developments promise to improve investigative accuracy while reducing manual workload, and cognitive bias (Solanke & Biasiotti, 2022).

However, AI implementation in forensic workflows raises questions of explainability and accountability (Solanke, 2022). For example, the deep learning algorithms' "black box" nature is neither transparent nor reproducible; therefore, the judicial admissibility of evidence becomes difficult (Richmond et al., 2023). Furthermore, the lack of standardized protocols and limited AI-focused training opportunities might hinder the adoption and integration of AI in digital forensic studies (Richmond et al., 2023).

To understand the behavioral aspects of adoption, models like Technology Acceptance Model (TAM), and Unified Theory of Acceptance and Use of Technology (UTAUT) have been employed across disciplines to predict user's intention to adopt new technology (Beraducci, 2025; Venkatesh et al., 2003). The recent empirical studies confirm that constructs like perceived usefulness (PU), perceived ease of use (PEOU), social influence (SI), and facilitating conditions (FC), significantly influence individuals' willingness to adopt AI technologies (BinJwair, 2025). For example, a study on AI adoption in academia found that trust and privacy concerns are key factors in forming acceptance (Rana et al., 2024).

However, a study emphasizes that interdisciplinary collaboration, technical training, and ethical concerns are necessary for responsible AI use in digital forensic investigations and adoption in digital forensic curricula (Akeiber, 2025).

Forensic educators and researchers have an important role in influencing future practitioners' understanding and competence regarding AI applications. Yet there is less research on the awareness, acceptance, and ethical concerns of AI among forensic academicians. The current study addresses this research gap through a quantitative cross-sectional and correlational analysis of academicians' perceptions of AI in digital forensics. It examines the key TAM constructs: PU, PEOU, SI, and extended variables like ethical concerns (EC) and trust and behavioral intention (TBI).

By employing descriptive statistics, correlation coefficients (r and r^2), and multiple regression analysis on survey responses from forensic academicians and research scholars, this study aims to assess the awareness, influence of academic norms, organizational structures, and institutional support mechanisms in the adoption of AI, and explore the ethical and trust related challenges perceived by academicians, by answering following questions:

Q1: What is the overall level of awareness, acceptance, and ethical perception toward the adoption of AI in digital forensics among forensic academicians?

Q2: How does awareness of AI in digital forensics influence the perceived usefulness (PU) of AI based forensic tools?

Q3: To what extent does awareness affect the perceived ease of use (PEOU) of AI-based forensic technologies among academicians?

Q4: What is the relationship between awareness and social influence (SI) in the adoption of AI in digital forensic education and research?

Q5: Does higher awareness correlate with increased ethical sensitivity and risk perception (EC) regarding AI applications in forensics?

Q6: How does awareness of AI impact trust and behavioral intention (TBI) toward adopting AI-based forensic tools?

Findings from this research will improve the understanding of the human and technology interface in next generation forensic science, guide AI system into forensic curricula, and support the development of ethics and governance in digital forensics.

2. Material and Methods

2.1. Study Design

This study was a quantitative and cross-sectional survey research design, aiming to examine the relation between awareness of AI in digital forensics and five major factors of acceptance and perception among forensic academicians. The five dependent factors included Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Social Influence (SI), Ethical Concerns and Perceived Risks (EC) and Trust and Behavioral Intention (TBI). 200 participants (N=200) were included in this study. The respondents consisted of forensic academicians and individuals from allied academic disciplines. Data collection was done through a structured questionnaire measuring awareness and the five dependent constructs mentioned above. Each construct was assessed using multiple items designed to evaluate participants' understanding, perception, and behavioral intention towards the adoption of AI in digital forensics. All responses were compiled for quantitative analysis using Microsoft Excel 2019.

2.2. Data analysis

To determine relationships between the variables, a spearman correlation test, and simple linear regression analysis were conducted. The independent variable was awareness, while the independent variables were PU, PEOU, SI, EC, and TBI. An additional analysis was performed to evaluate the relationship between EC and TBI. All statistical models were tested for significance at $p < 0.001$.

2.3. Ethical considerations

All data in the study were collected solely for academic purposes & research. Participants voluntarily provided their responses, and their identities were confidential throughout the research process.

2.4. Limitations

The study is based on the cross-sectional design, which captures perceptions of participants at single point of time. Therefore, a causal relationship between awareness and acceptance constructs cannot be definitively established. Data were collected using a self-reported questionnaire, which may introduce response bias. Participants' perception may not fully reflect their actual competence or practical experience.

3. Result and Discussion

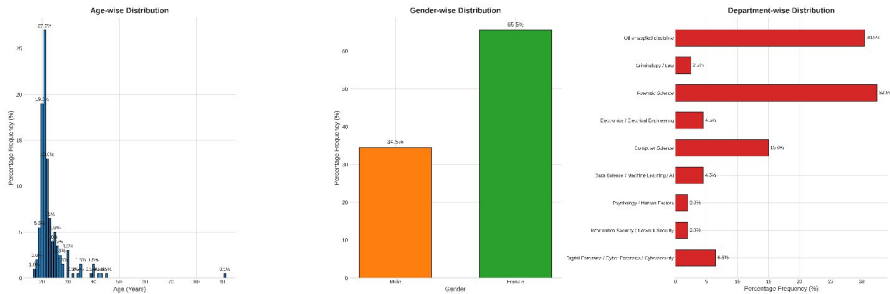


Figure 1. Demographic Distribution of Respondents on the Adoption of Artificial Intelligence in Digital Forensics – Awareness, Acceptance, and Ethical Concerns among University Students and Research Scholars.

Figure 1: Demographic distribution (age, gender and department based) of participants/academicians in this study (Source: Author)

Figure 1 has represented, the demographic distribution of the participants/academicians (N=200) based on their age group, gender, and departments for the study. The 1st panel has illustrated the age wise distribution, highlighting that most of the participants were between 20 to 22 years old, indicating a young academic demographic. The 2nd panel has represented gender-based distribution, highlighting that, female participants with 65.5% have outnumbered males with 34.5%. The 3rd panel has highlighted department wise distribution, with the highest responses from Forensic Science with 32.5% and other applied sciences 30.5%, followed by computer science with 15% and Digital forensics/cyber security with 6.5%. These demographic distributions collectively reflect a diverse yet academically inclined sample population.

To assess the relationship between Awareness and 5 aspects of the questionnaire, PU, PEOU, SI, EC, TBI, series of spearman correlation test has been performed utilizing simple linear regression analysis in Microsoft Excel 2019. A total of 200 responses has been selected for the analysis, so N= 200. After the linear regression analysis all models were proven statistically significant ($p < 0.001$), in depicting positive monotonic correlation with awareness (x) (shown in table 1).

Table 1: Result of spearman correlation test and linear regression analysis

Dependent	Regression Equation	Multiple	R ²	F (1,198)	p-value	β
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Variable (y)		R				(Slope)
PU	$y = 0.4997x + 50.284$	0.503	0.2529	67.01	< 0.001	0.4997
PEOU	$y = 0.6078x + 39.417$	0.614	0.3765	119.57	< 0.001	0.6078
SI	$y = 0.6382x + 36.357$	0.64	0.4096	137.39	< 0.001	0.6382
EC	$y = 0.4674x + 53.525$	0.47	0.2205	56.02	< 0.001	0.4674
TBI	$y = 0.529x + 47.337$	0.533	0.2844	78.71	< 0.001	0.5289

According to table 1, The rankings by explained variance (R^2) are- SI (0.410) > PEOU (0.377) > TBI (0.284) > PU (0.253) > EC (0.221).

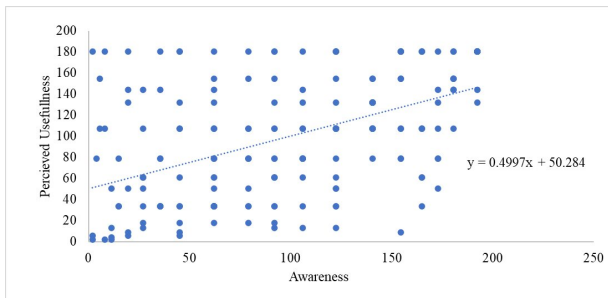


Figure 2a: Scatter plot representation of correlation between awareness and PU (Source: Author)

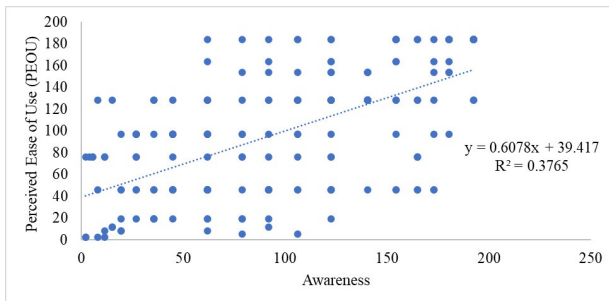


Figure 2b: Scatter plot representation of correlation between awareness and PEOU (Source: Author)

In the present study based on R^2 value from figure 2a and 2b, results have depicted that, academicians with higher awareness scores have perceived that AI-based forensic tools are more useful and easier to use. These findings align with TAM (Davis, 1989; Davis & Venkatesh, 1996). According to this model, knowledge and familiarity is directly proportional to PEOU. So, educational interventions that enhance AI awareness, are more likely to increase overall acceptance and practical adoption of artificial intelligence.

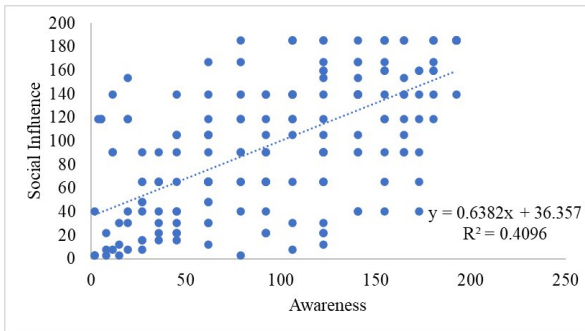


Figure 3: Scatter plot representation of the correlation between awareness and SI (Source: Author)

Again, strongest correlation was observed between awareness and SI, as shown in the figure 3. This finding suggests that, institutional encouragement, peer participation, and availability of resources are the crucial factors in motivating academicians to adopt AI technologies, supported by UTAUT (Viswanath Venkatesh et al., 2003). This has emphasized that, external support structures support systems impact behavioral intention. So, universities and research institutions should focus on creating supportive environments, those can provide technology-based resources and motivation.

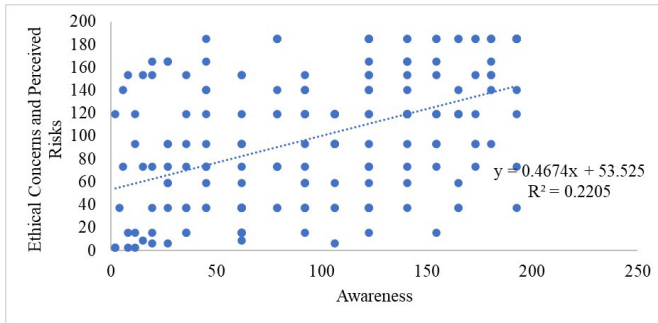


Figure 4: Scatter plot representation of the correlation between awareness and EC (Source: Author)

Although, moderate correlation between awareness and ethical concerns and perceived risks has underlined an important aspect of AI usage, as shown in the figure 4. As the awareness increases, users become more cautious to the issues related to privacy, biases, and accountability. These are essential aspects for forensic investigations. This dual effect of awareness, highlighting both acceptance and ethical reflection, emphasizes need for AI ethics modules with forensic science curricula (Jobin et al., 2019).

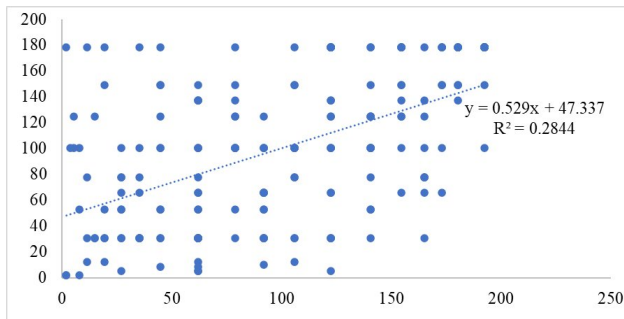


Figure 5: Scatter plot representation of the correlation between awareness and TBI (Source: Author)

Another, significant positive correlation between awareness and TBI has shown informed users are more confident in AI systems and show stronger willingness to augmenting them in future forensic endeavors, as illustrated in figure 5. This suggests that, trust is not merely a byproduct of

experience but can be gained through education and right communication about AI capabilities and limitations.

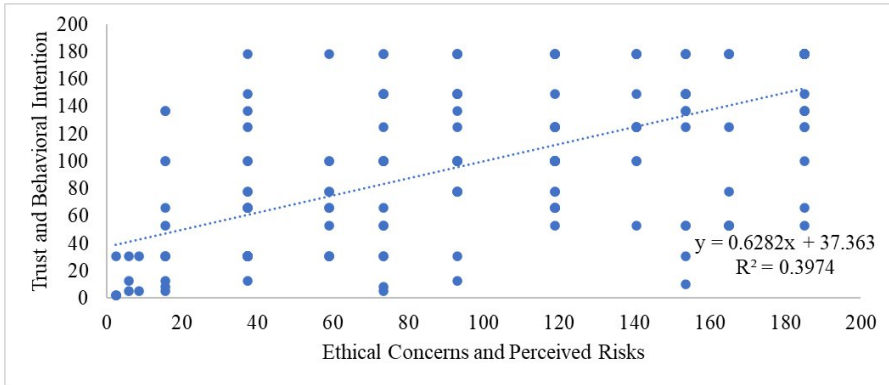


Figure 6: Scatter plot representation of the correlation between EC and TBI (Source: Author)

At last, most importantly a spearman correlation test along with linear regression analysis was conducted to assess the relation between EC (x), and TBI (y). The result has critically shown a statistically significance ($R=0.63, p < 0.001$). With regression model explaining 39.7% of the variance ($R^2 = 0.3974, F(1,198) = 130.59, p < 0.001$), also shown in figure 6.

The regression equation was: $y = 0.529x + 47.337$

This finding suggests that higher ethical awareness and risk perception are connected to greater trust and willingness to adopt AI technologies. It implies that academicians with stronger ethical sensitivity may not reject AI due risks associated with it, instead, they have shown responsible trust and informed acceptance, which reflects a mature attitude toward ethical AI integration in forensic investigations. Because, ethical concerns and perceived risks often undermine trust. But, according to the findings of our study, higher ethical sensitivity is associated with greater trust and intention to amalgamate AI can be reconciled with recent literature. According to some recent studies, informed users d not necessarily reject AI when they perceive risk, instead ethical awareness can coincide with trust based on expectations of transparency, accountability, and governance. Studies have shown that, transparency and explainability mechanisms help in repair and sustain the trust of the users, even when users recognized risks, because these mechanisms

signal that harms can be detected and mitigated (Wanner et al., 2022; Zerilli et al., 2022). Some recent review studies have also emphasized on trust in AI. They have stated trust in AI is multidimensional and it depends on technical (safety) and non-technical (ethical and legal) assurances. When users see ethical safeguard or in this case institutional support, their willingness to adopt increases despite of greater risk awareness (Afroogh et al., 2024; Nastoska et al., 2025). In the support of these reviews, models correlating ethical perception to adoption have highlighted that, ethical sensitivity can positively affect behavioral intention when it is accompanied by perceived organizational level or system level controls, turning proactiveness into conditional acceptance rather than outright rejection (Yu et al., 2025).

4. Conclusion

The study evaluated the relationship between awareness of artificial intelligence (AI), and five factors i.e. PU, PEOU, SI, EC and TBI influencing AI adoption in digital forensics among the forensic academicians. Statistical analysis using Spearman correlation and simple linear regression revealed that all tested relationships were statistically significant.

Among all the factors, SI showed highest correlation with awareness, followed by PEOU, TBI, PU, and EC. These results indicate that higher awareness of AI among academicians improves both perception of ease and usefulness of AI-based forensic tools, and is also strongly correlated with positive social and institutional influences. There is also significant positive correlation found between ethical concerns (EC) and trust & behavioral intention (TBI). This suggests that ethical concerns do not block the AI adoption, but it contributes to responsible trust and informed acceptance. Academicians who showed a greater ethical sensitivity were also more prominent in willing to combine AI in digital forensic investigations.

These findings prove the relevance of both TAM and UTAUT in explaining AI adoption behavior within forensic academic contexts. Therefore, it is evident that increasing AI awareness with the help of training and institutional support can significantly improve integration of AI-technologies in forensic science. Moreover, including AI ethics modules within forensic curricula and also creating supportive research environments will further promote responsible and innovative adoption of AI in digital investigations.

Conflict of Interest: No conflict of interest

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