EXPLORING ROLE OF ARTIFICIAL INTELLIGENCE IN DATA SECURITY MEASURES OF PUBLIC AND PRIVATE SECTOR BANKS OPERATING IN AKOLA AND BULDHANA DISTRICTS OF MAHARASHTRA

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1.0 Introduction

The rapid digitization of the banking sector has fundamentally transformed financial service delivery, offering unparalleled convenience and efficiency. However, this digital revolution has concurrently escalated the sophistication and frequency of cyber threats (Mishra, 2023), making data security a paramount concern for financial institutions worldwide. In this evolving threat landscape, Artificial Intelligence (AI) has emerged as a transformative force, offering advanced capabilities in threat detection, fraud prevention (Mohammed and Rahman, 2024), and predictive risk analysis (Khan et al., 2023). While banks in major metropolitan areas have been swift to adopt these technologies, the integration and efficacy of AI in the data security frameworks of banks operating in semi-urban and emerging districts remain a critical area for exploration (Polireddi, 2024). This research study, entitled "Exploring the Role of Artificial Intelligence in Data Security Measures of Public and Private Sector Banks," seeks to address this gap by conducting a focused investigation within the distinct economic context of the Akola and Buldhana districts of Maharashtra. The study aims to undertake a comparative analysis to evaluate the current adoption levels, implementation strategies, and perceived effectiveness of AI-driven security tools—such as machine learning algorithms for anomaly detection and natural language processing for monitoring—in safeguarding sensitive customer data (Basri and Almutairi, 2023). By examining the challenges and opportunities unique to these regions, this research will provide valuable insights for bank administrators, policymakers, and technology providers, ultimately contributing to the development of more resilient and inclusive cybersecurity paradigms for India's burgeoning banking ecosystem.

2.0 Research Methodology

The methodology for this study was meticulously designed to ensure the systematic collection and robust analysis of data to achieve the research objectives. This study adopts a descriptive and cross-sectional research design to provide a detailed snapshot of the current state of AI integration in data security practices within the specified context. The population for this study comprises employees of public and private sector banks operating within the geographical confines of Akola and Buldhana districts, with a specific focus on personnel in roles directly interfacing with data security and IT management, such as IT managers, cybersecurity analysts, branch managers, and operational heads. To draw meaningful insights from this population, a stratified random sampling technique was employed. The banking sector (public and private) served as the strata to ensure proportional and representative representation from both sectors. From each stratum, a sample size of 80 respondents was selected, resulting in a total sample of 160 respondents (80 from public sector banks and 80 from private sector banks).

The primary data collection method was survey technique, utilizing a structured questionnaire as the research instrument. This questionnaire was designed with a mix of closed-ended questions, including Likert scales to gauge perceptions and levels of agreement, and multiple-choice questions to capture demographic and factual data regarding AI tools in use. The survey instrument was validated for content validity through consultation with experts in the fields of banking and information technology and tested for reliability using a pilot study. The data collection was administered through a combination of online surveys (distributed via email and professional networks) and in-person visits to bank branches to ensure a high response rate and to clarify any queries from respondents. Subsequently, the collected quantitative data was coded and tabulated for analysis using SPSS 24.0 statistical software. The analysis involved descriptive statistics (including frequencies, percentages, etc.) to summarize the data and inferential statistical techniques, specifically Chi-Square test was used.

3.0 Results and Discussion

3.1 Education level of bank employees

Table No. 1: Education qualification of bank employees of Akola and Buldhana district

Educational level	Public		Private	
	No	Percent	No	Percent
Diploma	14	17.5	22	27.5
Graduate	37	46.3	42	52.5
Post Graduate	29	36.3	16	20.0
Total	80	100.0	80	100.0
	χ^2= 10.228; **df**: 2; χ^2_{crit}= 9.49; p<0.05		χ^2= 13.903; **df**: 2; χ^2_{crit}= 9.49; p<0.05	

Above **Table 1** shows results of educational qualification of bank employees of Akola and Buldhana district. The data collected shows that 17.5% employees working in public sector banks are diploma educated while 46.3% employees of public sector bank have done graduation. In addition to this 36.3% employees have done post-graduation. Furthermore 27.5% employees working in private sector banks are diploma educated while 52.5% employees of private sector bank have done graduation and 20.0% employees have done post-graduation.

3.2 Occupational Experience

Table No. 2: Occupational experience of bank employees of Akola and Buldhana district

Occupational Experience	Public		Private	
	No	Percent	No	Percent
Less than 5yrs	7	8.8	18	22.5
5-10yrs	18	22.5	41	51.3
10-15yrs above	13	16.3	16	20.0
More than 15 yrs	42	52.5	5	6.3
Total	80	100.0	80	100.0
	χ^2= 35.3; **df**: 3; χ^2_{crit}= 9.49; p<0.05		χ^2= 34.3; **df**: 3; χ^2_{crit}= 9.49; p<0.05	

Above **Table 2** shows results of occupational experience of bank employees of Akola and Buldhana district. The data collected shows that 8.8% employees working in public sector banks have less than 5 years of working experience while 22.5% employees have experience of 5-10 years. In addition to this 16.3% and 52.5% employees have 10-15 years and more than 15 years of working experience. Furthermore, 22.5% employees have 22.5% employees working in private sector banks have less than 5 years of working experience while 51.3% and 20.0% employees have 5-10years and 10-15 years of working experience. However 6.3% employees working in private sector banks have more than 15 years of occupational experience.

3.3 Awareness about the bank's data security policy

Table No. 3: Awareness of public and private bank employees about bank's data security policy

	Public		Private	
	No	Percent	No	Percent
Yes	61	76.3	69	86.3
No	6	7.5	4	5.0
Can't say	13	16.3	7	8.8
Total	80	100.0	80	100.0
	χ^2= 67.242; **df**: 2; χ^2_{crit}= 9.49; p<0.05		χ^2= 101; **df**: 2; χ^2_{crit}= 9.49; p<0.05	

Above **Table 3** shows information pertaining to awareness of the employees working in public and private sector banks of Akola and Buldhana district about bank's data security policy.

- **Public sector Employees:** The results show that 76.3% public bank employees are aware about bank' data security policy, while 16.3% employees are not sure about it. Furthermore 7.5% public sector bank employees are not aware about it.
- **Private sector Employees:** The results show that 86.3% private bank employees are aware about bank' data security policy, while 8.8% employees are not sure about it. Furthermore 5.0% private sector bank employees are not aware about it.

3.4 Responsibility of maintaining computer systems

Table No. 4: Information about the responsibility of maintaining computer systems

	Public		Private	
	No	Percent	No	Percent
In-house	49	61.3	20	25.0
AMC	16	20.0	38	47.5
Not specific	15	18.8	22	27.5
Total	80	100.0	80	100.0
	χ^2= 28.082; **df**: 2; χ^2_{crit}= 9.49; p<0.05		χ^2= 7.302; **df**: 2; χ^2_{crit}= 9.49; p<0.05	

Above **Table 4** shows information pertaining to responsibility of maintaining computer systems in

the public and private sector banks of Akola and Buldhana district.

- **Public sector Employees:** The results show that according to 61.3% public bank employees maintaining computer system is done by in-house employees, while 20.0% employees stated it is done by AMC. Furthermore, according to 18.8% public sector bank employees responsibility of maintaining computer systems is not fixed.
- **Private sector Employees:** The results show that according to 25.0% private bank employees maintaining computer system is done by in-house employees, while 47.5% employees stated it is done by AMC. Furthermore, according to 27.5% private sector bank employees responsibility of maintaining computer systems is not fixed.

3.5 Frequency of data back-up process

Table No. 5: Frequency of data back-up process in the public and private sector banks

	Public		Private	
	No	**Percent**	**No**	**Percent**
24X7	6	7.5	19	23.8
Fortnightly	24	30.0	28	35.0
Monthly	39	48.8	23	28.8
Quarterly	11	13.8	10	12.5
Total	80	100.0	80	100.0
	χ^2= 32.7; **df**: 3; χ^2_{crit}= 9.49; p<0.05		χ^2= 8.7; **df**: 3; χ^2_{crit}= 9.49; p<0.05	

Above **Table 5** shows information pertaining to frequency of data back-up process in the public and private sector banks of Akola and Buldhana district.

- **Public sector Employees:** The results show that according to 7.5% public bank employees data back-up process is done 24X7, while 30.0% employees stated it is done fortnightly. Furthermore, according to 48.8% and 13.8% public sector bank employees data back-up process is done on monthly and quarterly basis respectively.
- **Private sector Employees:** The results show that according to 23.8% private bank employees data back-up process is done 24X7, while 35.0% employees stated it is done fortnightly. Furthermore, according to 28.8% and 12.5% private sector bank employees data back-up process is done on monthly and quarterly basis respectively.

3.6 Perform employee reference or background checks using AI

Table No. 6: Employee reference or background checks performed by banks using AI

	Public		Private	
	No	**Percent**	**No**	**Percent**
Yes	19	23.8	49	61.3
No	61	76.3	31	38.8
Total	80	100.0	80	100.0
	χ^2= 22.05; **df**: 1; χ^2_{crit}= 9.49; p<0.05		χ^2= 4.05; **df**: 1; χ^2_{crit}= 9.49; p<0.05	

Above **Table 6** shows information pertaining to Employee reference or background checks performed in the public and private sector banks using AI of Akola and Buldhana district.

- **Public sector Employees:** The results show that according to 23.8% public bank employees, employee reference and background check is done while recruiting by their bank, while 76.3% bank employees stated that employee reference and background check is not done in their bank.
- **Private sector Employees:** The results show that according to 61.3% private bank employees, employee reference and background check is done while recruiting by their bank, while 38.8% bank employees stated that employee reference and background check is not done in their bank.

3.7 Periodic inspection and testing the operability of the emergency response mechanism using AI

Table No. 7: Periodic inspection and testing the operability of the emergency response mechanism using AI

	Public		Private	
Response	**No**	**Percent**	**No**	**Percent**
Yes	63	78.8	59	73.8
No	17	21.3	21	26.3
Total	80	100.0	80	100.0
	χ^2= 26.45; **df**: 1; χ^2_{crit}= 9.49; p<0.05		χ^2= 18.05; **df**: 1; χ^2_{crit}= 9.49; p<0.05	

Above **Table 7** shows information pertaining to periodic inspection and testing of the operability of the emergency response mechanism using AI in the public and private sector banks of Akola and Buldhana district.

- **Public sector Employees:** The results show that according to 78.8% public bank

employees, periodic inspection and testing of the operability of the emergency response mechanism using AI is done by their bank while 21.3% bank employees stated it is not done in their bank.

- **Private sector Employees:** The results show that according to 73.8% private bank employees, periodic inspection and testing of the operability of the emergency response mechanism using AI is done by their bank while 26.3% bank employees stated it is not done in their bank.

4.0 Conclusions

4.1 Education level of bank employees

- On the basis of the study results it is evident that most of the employees working in public and private sector banks of Akola and Buldhana district have done graduation.

4.2 Occupational Experience

- On the basis of the study results it is evident that most of the employees working in public sector banks of Akola and Buldhana district have occupational experience of more than 15 years while employees working in private sector banks have 5-10 years of occupational experience.

4.3 Awareness about the bank's data security policy

- In view of the study results it is evident that most of the employees working in public and private sector banks of Akola and Buldhana district are aware about bank' data security policy.

4.4 Responsibility of maintaining computer systems

- In view of the study results it is evident that in most of the public sector banks of Akola and Buldhana district maintenance of computer system is done by in-house employees and in private sector banks it is done by AMC.

4.5 Frequency of data back-up process

- In view of the study results it is evident that in most of the public sector banks of Akola and Buldhana district data back-up process is done by monthly and in private sector banks it is done fortnightly.

4.6 Perform employee reference or background checks using AI

- In view of the study results it is evident that most of the public sector banks of Akola and Buldhana district do not perform employee reference and background check while private sector banks using AI perform this while recruiting.

4.7 Periodic inspection and testing the operability of the emergency response mechanism using AI

- In view of the study results it is evident that most of the public and private sector banks of Akola and Buldhana district conduct periodical inspection and testing of the operability of the emergency response mechanism using AI.

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