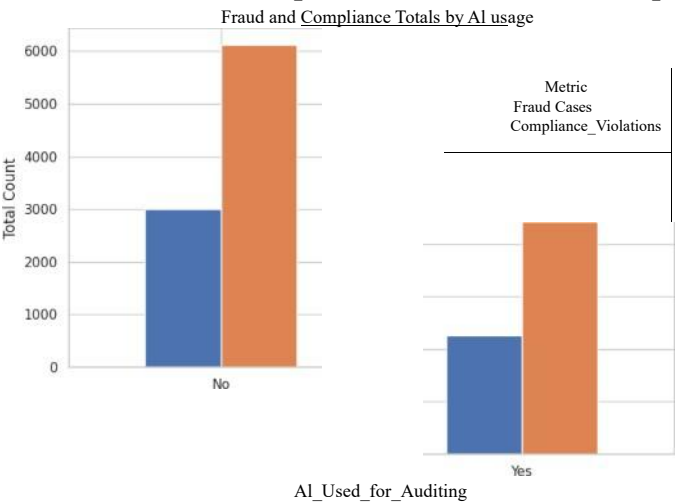


Business questions were answered using Spark SQL

After exploring audit patterns and organizational trends, the focus turns to a set of business-oriented questions designed to extract strategic insights. These questions address critical concerns in audit performance, compliance outcomes, and financial risk management across firms and industries.

Can AI adoption reduce fraud and improve compliance in Big 4 firms?



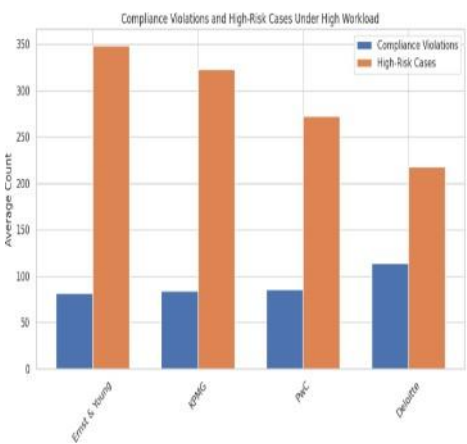
AI_Used_for_Auditing	total_fraud_cases	total_compliance_violations
No	3010	6122
Yes	2260	4426

Yes, it can; firms without AI reported 3,010 fraud cases and 6,122 compliance violations.

Firms with AI reported 2,260 fraud cases and 4,426 compliance violations.

This reflects a 25% reduction in fraud and a 28% reduction in compliance violations when AI was used.

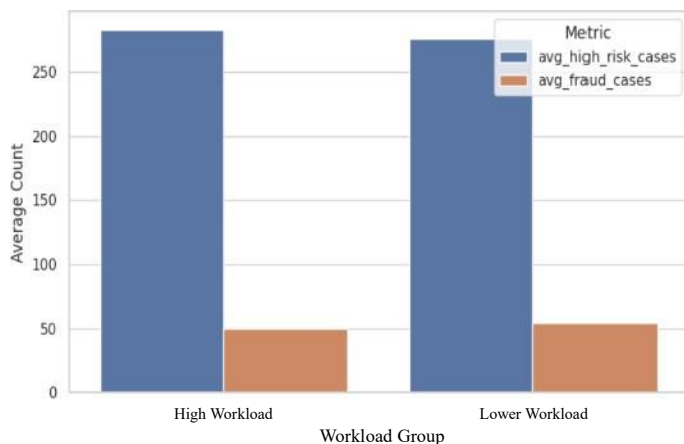
Which firm managed to maintain the best compliance performance despite a high workload?



Firm Name	avg_workload	avg_compliance_violations	avg_high_risk_cases
Ernst & Young	74.85714285714286	81.28571428571429	348.2857142857143
KPMG	72.83333333333333	84.0	323.0
PwC	75.0	85.8	272.6
Deloitte	74.1	114.0	217.9

Ernst & Young had the highest workload and stands out with the lowest compliance violations\*\* (—81 ) among peers under pressure, even though its high-risk case volume is the highest.

Is there a clear relationship between auditor workload and the likelihood of high-risk audits?



workload_group	avg_workload	avg_high_risk_cases	avg_fraud_cases
High Workload	74.17857142857143	282.7857142857143	49.67857142857143
Lower Workload	54.833333333333336	275.7638888888889	53.875

When comparing audit teams with heavier workloads to those with lighter ones, the difference in high-risk cases is small. On average:

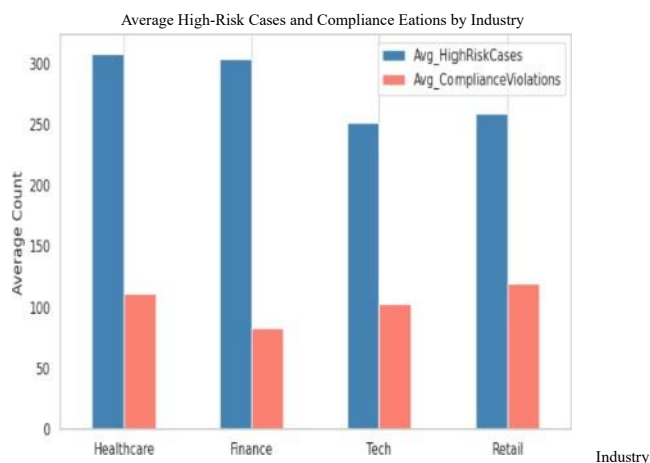
Teams with high workload handled about 283 high-risk cases

Teams with lower workload handled about 276 high-risk cases

That's only a slight difference and not enough to say there's a clear link.

Surprisingly, teams with lower workloads actually detected more fraud cases than the high-workload teams (about 54 vs. 50). That goes against what you might expect; maybe busier teams have less time to dig deep, or maybe they're just focusing on keeping up. In conclusion, just because a team is busier doesn't necessarily mean they'll run into more high-risk audits or fraud. The relationship isn't strong here. It's possible that other factors, such as the tools they use their experience, or how audits are assigned, have more impact than how busy they are.

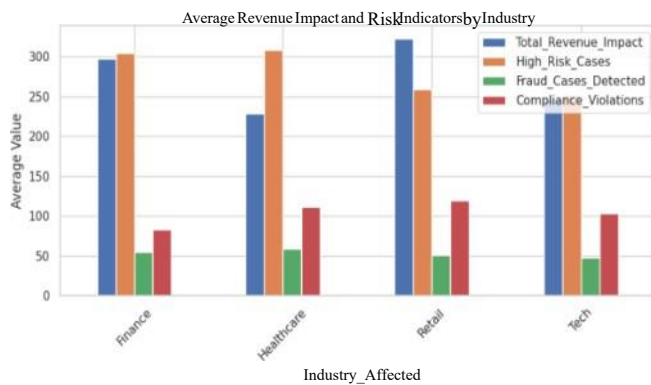
Are certain industries more prone to high-risk audits or compliance failures than others?



Industry_Affected	Avg_HighRiskCases	Avg_ComplianceViolations
Healthcare	308.1251	111.04166666666667
Finance	304.251	83.451
Retail	1259.2592592592592	119.48148148148148
Tech	1251.482758620689651	103.034482758620681

Healthcare stands out as the most vulnerable, with the highest average of high-risk audit cases (308.13) and the second highest with compliance violations (111.04). Surprisingly, retail had the highest average compliance violations. This suggests that audits in the healthcare sector and retail frequently uncover serious issues

Which industries face the highest average financial risk from audit-related issues, and how do their risk indicators (e.g., compliance violations, fraud cases) compare?



Industry Affected	Total Revenue Impact	High Risk Cases	Fraud Cases Detected	Compliance Violations
Finance	297.01	304.25	55.05	83.45
Healthcare	228.15	308.13	58.75	111.04
Retail	322.09	259.25	50.56	119.48
Tech	246.27	251.48	48.07	109.03

The chart and summary table highlight meaningful differences in how industries are affected by audit-related risks:

- Retail faces the highest average revenue impact (-\$322M), despite not leading in fraud or compliance violations. This suggests fewer but more financially severe incidents.
- Healthcare shows the highest volume of high-risk cases and violations but has a lower average financial impact (-\$228M), indicating more frequent, lower-cost issues.
- Finance experiences both high-risk exposure and substantial financial losses (—\$297M), signaling a dual challenge of volume and cost.
- Tech reports fewer fraud and compliance problems but still shows a notable average loss (—\$246M), suggesting that when failures do occur, they may be significant.

These patterns indicate that industry-specific strategies are needed:

- Retail may benefit from mitigating rare but high-cost incidents.
- Healthcare and finance should prioritize reducing the frequency of audit-related failures and violations.